



Harnessing the Power of Sleep for Healthy Brain Ageing

A guide for older adults and people living with
cognitive decline





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From the CogSleep Chief Investigators

We are proud to present this brief, accessible and thorough resource on dementia and sleep. It's designed for people living with dementia, their carers and all adults wanting to optimise their cognitive health.

More than 70 per cent of people living with dementia have disturbed or disrupted sleep. This can lead to reduced quality of life, increased risks of falls and poorer physical and cognitive functioning.

It has been produced by CogSleep, the federally funded National Health and Medical Research Council (NHMRC) Centre of Research Excellence (CRE) to Optimise Sleep in Brain Ageing and Neurodegeneration. Many thanks to Dr Jade Murray and the CogSleep Academy, who coordinated production.

The many clinical trials conducted by the CogSleep CRE (2018-2023) have increased our understanding of the role of lifestyle factors, including diet, exercise and light exposure in improving sleep in people living with dementia. We hope that the simple and clear explanations and helpful tips can provide new insights and routines, throughout the day and night, to help improve quality of life via better sleep.



Professor Sharon L Naismith

Chief Investigator, CogSleep
Director, Healthy Brain Ageing Program
Brain and Mind Centre
The University of Sydney



Professor Shantha MW Rajaratnam

Head, School of Psychological Sciences
Deputy Director, Turner Institute for Brain and
Mental Health, Monash University
Sleep Health Foundation Fellow



What is Dementia?

Dementia is an umbrella term that describes several diseases that cause memory loss, difficulties in problem solving, language, and other aspects of thinking severe enough to impact a person's day to day life.

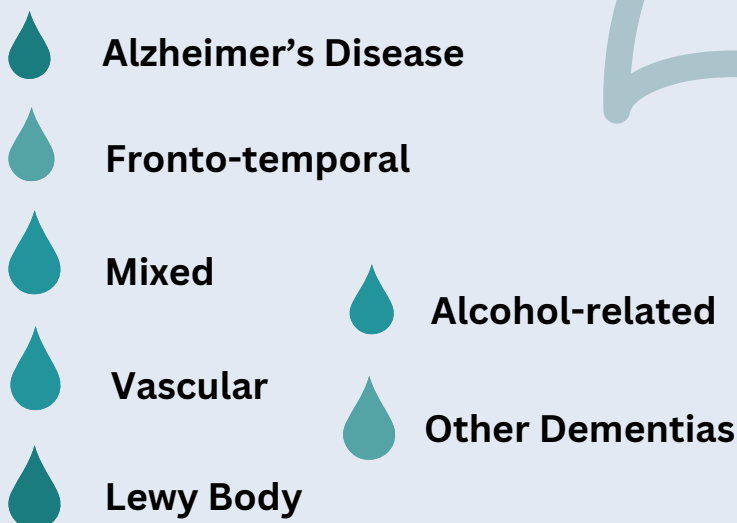
Dementia has several forms, including Alzheimer's Disease, Vascular Dementia, Dementia with Lewy Bodies, Frontotemporal dementia, and Parkinson's Disease dementia. Each of these subtypes has unique underlying pathology and different symptoms.

For instance, in **Alzheimer's Disease**, abnormal accumulation of beta-amyloid protein and memory loss are key characteristics - whereas alpha-synuclein protein aggregates are associated with Dementia with Lewy Bodies and Parkinson's Disease dementia.

Dementia

Loss of memory and other thinking abilities severe enough to interfere with daily life.

150 causes



Source: Dementia Australia

What is Dementia?

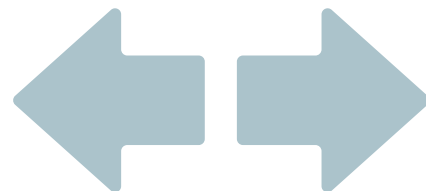
Sleep and dementia

While more than **70 per cent of people with dementia experience sleep disturbances**, the nature and symptoms of these sleep difficulties differ across individuals.

For instance, acting out dreams during **rapid eye movement (REM)** sleep is associated with Dementia with Lewy Bodies and Parkinson's Disease dementia, but is less frequent in Alzheimer's Disease and Vascular Dementia.

Nonetheless, sleep disturbances can exacerbate behavioural and cognitive symptoms of dementia. **Optimal management** of sleep disturbances is important for individuals living with dementia and their families.

Sleep and Alzheimer's Disease a bidirectional relationship



Sleep is a complex process, involving many parts of the brain.

In the earliest stages of Alzheimer's disease, brain changes occur in areas involved in sleep, a number of which also support **memory and learning**.

Sleep disturbance may be the first observable symptom of Alzheimer's Disease, and as brain changes become more severe sleep problems and symptoms increase together.

There is a bidirectional relationship between sleep disturbances and Alzheimer's Disease.

Poor sleep increases the build-up of Alzheimer's disease toxic proteins (beta-amyloid and tau) in the brain and is a lifestyle risk factor.

At the same time, Alzheimer's disease brain changes can exacerbate poor sleep, making symptoms worse.

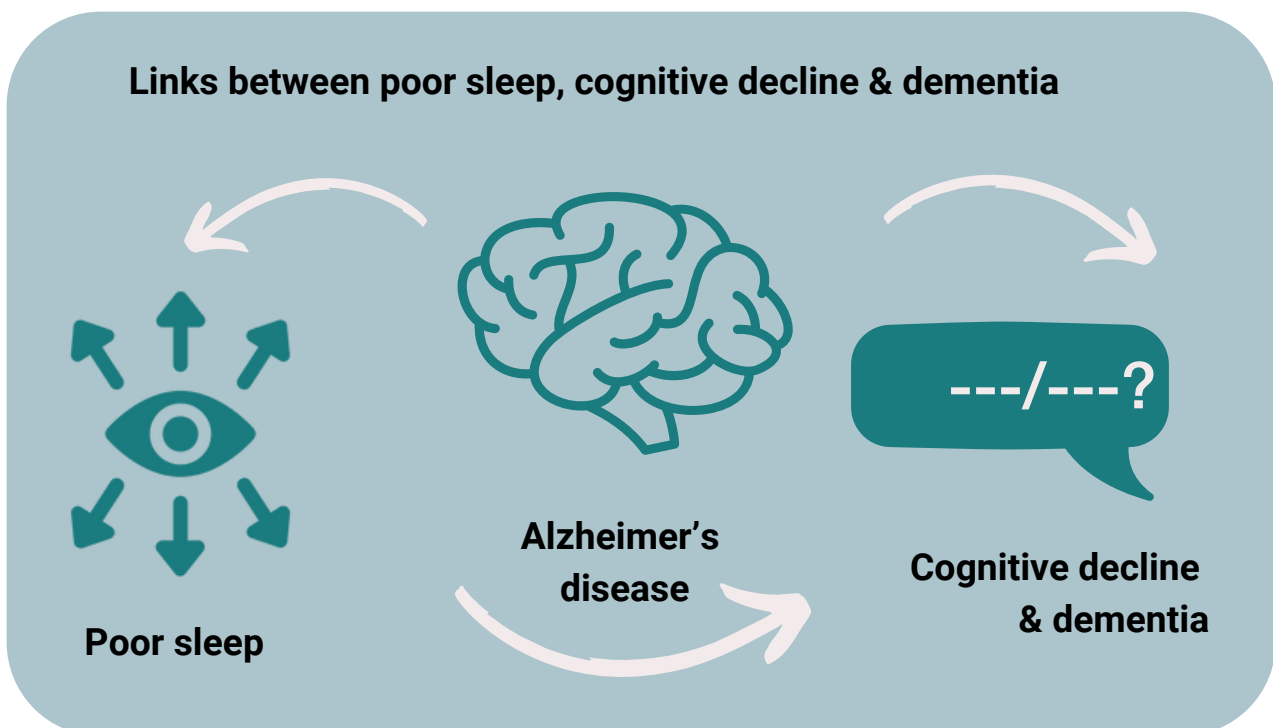
Sleep & Alzheimer's disease

Research indicates that good quality sleep helps to remove these toxins from the brain, via a waste clearance system known as the glymphatic system.

During the deepest stage of sleep, known as slow wave sleep, the tiny spaces between the brain cells increases in volume allowing toxic proteins, such as amyloid-beta and tau, to wash from the brain into the cerebrospinal fluid.

Poor sleep may lead to a failure in this waste clearance function allowing these **toxic proteins to accumulate**, increasing the risk of Alzheimer's disease.

Research with healthy older adults links short sleep time, poorer sleep efficiency (proportion of time spent asleep while in bed) and shorter time spent in deep slow wave sleep with faster accumulation of brain beta-amyloid. People with **obstructive sleep apnea** (both healthy older adults and those with mild cognitive impairment) have been found to accumulate both beta-amyloid and tau proteins at a faster rate.



Sleep & Memory

Sleep's role in memory and learning

Good quality sleep is essential for learning and memory. Good sleep is important before learning as it helps our brain to focus attention on new information we wish to learn (encoding). A good night sleep will help with the storage of these new memories and with transferring the information into long term memory so that information can be easily retrieved and connected to other memories. This also frees up space so that we can absorb and lay down new memories the next day and beyond.

Poor sleep and risk of cognitive decline and dementia

In the short-term poor sleep can make us excessively sleepy, reduce our attention, speed of thinking and cognitive flexibility, as well as impair our memory, judgement, problem-solving skills and emotional processing, Poor sleep is also linked with depression and anxiety.

People experiencing poor sleep quality, quantity or obstructive sleep apnea may also have changes in cardiovascular health, and may also have changes in the integrity of their brain blood vessels, as well as a higher risk of Alzheimer's disease and dementia.

Good sleep is increasingly seen to offer protection for our memory and thinking skills.

Improving our sleep may help to delay the onset or reduce the likelihood of developing dementia due to Alzheimer's disease.

While there is no conclusive evidence at this stage to support that sleep improvement plays a role in preventing cognitive decline, current Australian research is aiming to answer this question in near future.



Changes to Sleep in Dementia

Changes to our sleep are a normal part of ageing.

Most older adults without dementia notice changes in their sleep, including difficulties in falling asleep, poor sleep quality and more night awakenings.

As we age, the structure of our sleep changes so that we have **less slow wave sleep** (deep sleep) and **less rapid eye movement** (REM) sleep. It's also common for sleep to become more fragmented, with frequent awakenings throughout the night, resulting in reduced overall sleep quality.

Changes in the timing of the body's internal clock also commonly occur. However, while these changes occur in normal, healthy ageing, they are likely to be much more dramatic and disruptive in dementia.

The most common symptoms of sleep disturbances individuals with dementia experience include:

Disrupted Sleep-Wake Patterns

People with dementia often experience disturbances in their sleep-wake cycle. In extreme cases, they might sleep during the day and stay awake at night, leading to a reversal of their normal sleep patterns.

Insomnia

Individuals with dementia might struggle with falling asleep or staying asleep. This can lead to frustration, daytime sleepiness, and worsened cognitive function.

Increased Daytime Napping

Some individuals with dementia might nap excessively during the day due to poor sleep at night. This can further disrupt their nighttime sleep patterns.

Difficulty Recognising Night and Day

Some individuals with dementia can lose their ability to distinguish between day and night, further contributing to sleep-wake cycle disturbances.

Changes to Sleep in Dementia

Every individual with dementia is unique, and their sleep disturbances might vary. However, identifying and treating sleep concerns is important because it alleviates stress for the individual and their caregiver, and potentially slows the cognitive decline.

When considering treatment for sleep disturbances in dementia, it's important to implement non-pharmacological interventions where possible.

Creating a calm and consistent bedtime routine, providing a comfortable sleep environment, managing pain or discomfort, and incorporating physical and cognitive activity during the day can all contribute to better sleep.

Caregivers should also consider consulting with healthcare professionals experienced in dementia care to develop personalised strategies for managing sleep issues and treatments that may address disrupted circadian rhythms.



Sleep Disorders Associated with Dementia

Several sleep disorders are associated with dementia (although they can occur in its absence). These disorders can exacerbate cognitive decline, behavioural disturbances, and overall quality of life for individuals with dementia.

Consulting with healthcare professionals experienced in both dementia care and sleep medicine can help develop tailored strategies to improve sleep quality and overall well-being.

Restless Legs Syndrome (RLS) is characterised by an irresistible urge to move the legs, often accompanied by uncomfortable sensations. It can disrupt sleep and contribute to sleep deprivation in individuals with dementia.

Periodic Limb Movement Disorder (PLMD) involves involuntary leg movements during sleep, which can disrupt sleep continuity and overall sleep quality.

Obstructive Sleep Apnea causes people to partially or completely stop breathing during sleep. It causes fragmented sleep and lack of oxygen, which impact brain health. Sleep apnea can worsen cognitive impairment and other dementia symptoms, but it can be treated.

REM Sleep Behaviour Disorder (RBD) involves acting out vivid and often unpleasant dreams during the REM sleep phase. It's more common in conditions like Lewy body dementia. Individuals with RBD can physically move, shout, or even become aggressive during sleep.

Insomnia involves difficulty falling asleep, staying asleep, or experiencing non-restorative sleep. Individuals with dementia might experience insomnia due to cognitive and emotional aspects of their condition.

Concerns around Sleep in Dementia

Even though they're not exactly sleep problems, there are behaviours related to sleep that happen in people with dementia.

Sundowning

In the late afternoon or early evening, people with dementia might become more confused, restless, or upset. This is called sundowning. It can make it hard for them to sleep at night and can be tough for both them and the people taking care of them. We're not sure exactly why sundowning happens, but it might have to do with changes in the brain linked to dementia.

Nighttime Wandering

Some people with dementia wander around without a purpose, especially at night. This can be dangerous and worrisome for the people looking after them.

Restlessness and Agitation

Sleep problems can make people with dementia feel more upset, restless, or agitated. This could lead to them yelling, crying, or talking during the night.

There could be other reasons why these things are happening: **emotional distress, depression or anxiety, pain, confusion, unfamiliar surroundings**, or difficulties communicating needs. Regardless of the cause, keeping a regular routine can help.

Doing the same things at the same times each day—like eating, doing activities, and going to bed—can make things more predictable and less confusing. This can improve sleep and reduce worry. It is also important to seek help and guidance from a healthcare professional.



Healthy Habits for Sleep

Physical activity

Physical activity is important for many aspects of our health, reducing the risk of diabetes, heart disease, and obesity. But did you know that it can also help improve sleep and memory?



Studies show that physical activity can reduce the risk for older adults developing poor sleep, and influence sleep quality and sleep medication use.

Establishing a daily routine that includes regular physical activity can help reinforce the body's natural sleep-wake cycle.

What kind of exercise helps?

- Both resistance and aerobic exercise improve sleep and memory
- Strength training is important as we age and can reduce falls
- Variety and consistency are key. Current recommendations are 150 minutes of moderate intensity exercise per week

Regular physical activity can contribute to sleep quality through:

- changes in body temperature
- boosting mood and decreasing anxiety
- increasing factors in the brain that enhance brain health
- reducing inflammation
- realigning the biological clock

Many studies have **combined exercise with light therapy** to see greater improvements in sleep, and **reduced sleep disturbance** in people living with dementia. Discuss any new exercise regimens with a healthcare professional before starting.



Healthy Habits for Sleep Diet

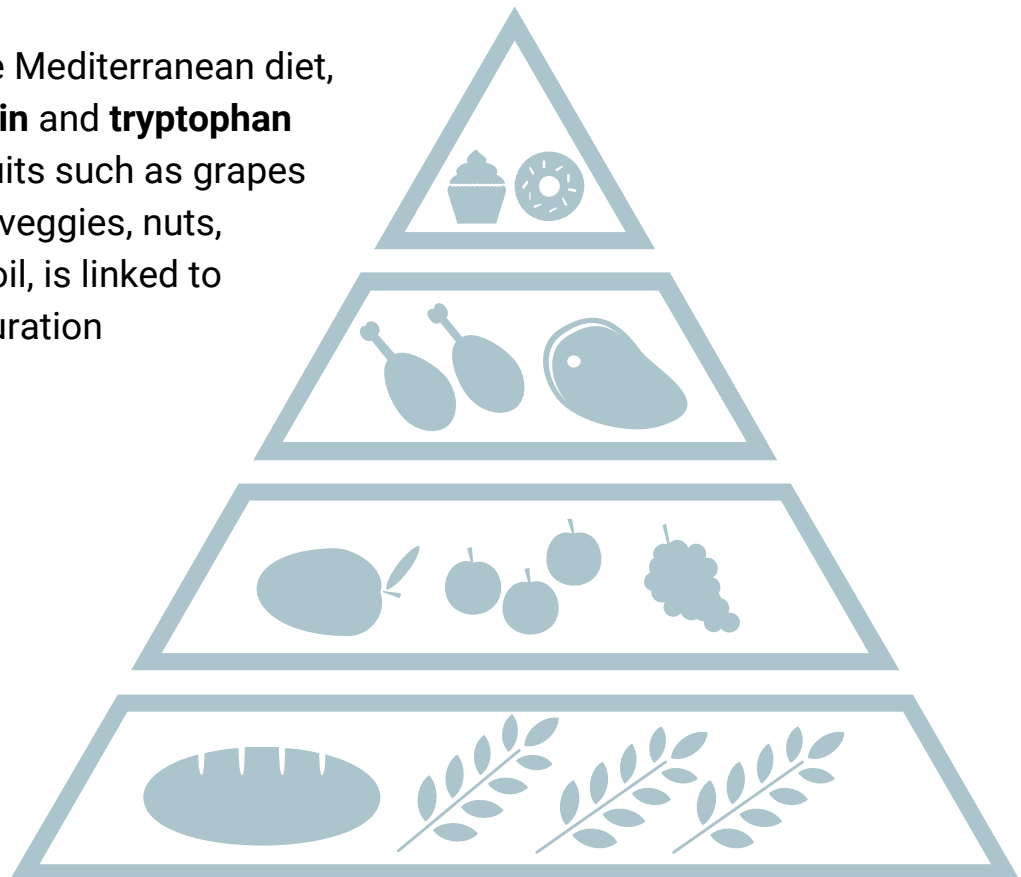
Sleep and diet are interrelated: poor sleep leads to bad eating habits, while an unhealthy diet can disrupt sleep.

Diet is thought to decrease dementia risk through several factors. In recent years, it has been found that **dietary patterns, rather than specific nutrients** or food groups, are more beneficial in decreasing cognitive decline.

Several dietary patterns have been linked with decreased dementia risk, such as the **Mediterranean Diet**, the **MIND diet** and **DASH diet**, all of which are predominantly plant based.

A balanced diet with such nutrients promotes consistent sleep patterns and improves overall well-being.

Adhering to the Mediterranean diet, rich in **melatonin** and **tryptophan** sources like fruits such as grapes and tomatoes, veggies, nuts, fish, and olive oil, is linked to better sleep duration and quality.



Healthy Habits for Sleep Diet

Both what you eat and how you sleep can dementia risk and how your cognitive abilities change over time. Here are some simple food strategies:

Eat more veggies and fruits Aim for 5 servings of vegetables and 2 servings of fruit daily. Choose ones with **melatonin** or **tryptophan**, like cherries, pineapple, kiwi, tomatoes, and avocados

Cut down on fatty foods Avoid high-saturated fat foods like chips and fried foods. Instead, go for **unsaturated fats** found in avocados, nuts, and seeds.

Eat fish often Have fish or seafood 2-3 times a week for omega-3 and 6 fatty acids. Fun fact: Tuna is rich in tryptophan!



Enjoy eggs in moderation

You can have up to 7 eggs a week, but be mindful if you're at risk of heart disease.



Go meat-free

Skip meat and have beans or legumes. once a week. They're high in fibre, low in fat, and contain melatonin.



Watch your caffeine

Cut back on caffeinated drinks, especially in the afternoon.



Limit alcohol

Consume no more than 10 standard drinks a week

Healthy Habits for Sleep Routines

Keeping to a routine helps to reduce stress and confusion – but it's also important to keep life interesting for people living with dementia by varying daily activities, exercise and meals: maintaining a routine but varying activities throughout the day is ideal.



Tips for building a routine

Be consistent about bedtime, wake up time and when you have your meals every day. Consider setting the alarm at the same time each day.

Have your last meal **at least 3 hours** before bed.

Follow the same **pre-bed routine** each night:

- Relax with calming activities, like quiet **reading**, deep **breathing**, low-impact **stretching** and listening to **ambient music**.
- Turn off or put away **electronic devices** (smartphones, tablets and laptops) in a different room.

Get out of bed if you can't sleep after **20 minutes**. Engage with a calming activity in **low light**, and get back to bed when you feel sleepy.

Try to get **7-8 hours'** sleep

Only use your bed for **sleep and sex** - avoid eating, watching TV, working – and only get into bed when you're feeling tired enough to fall asleep.

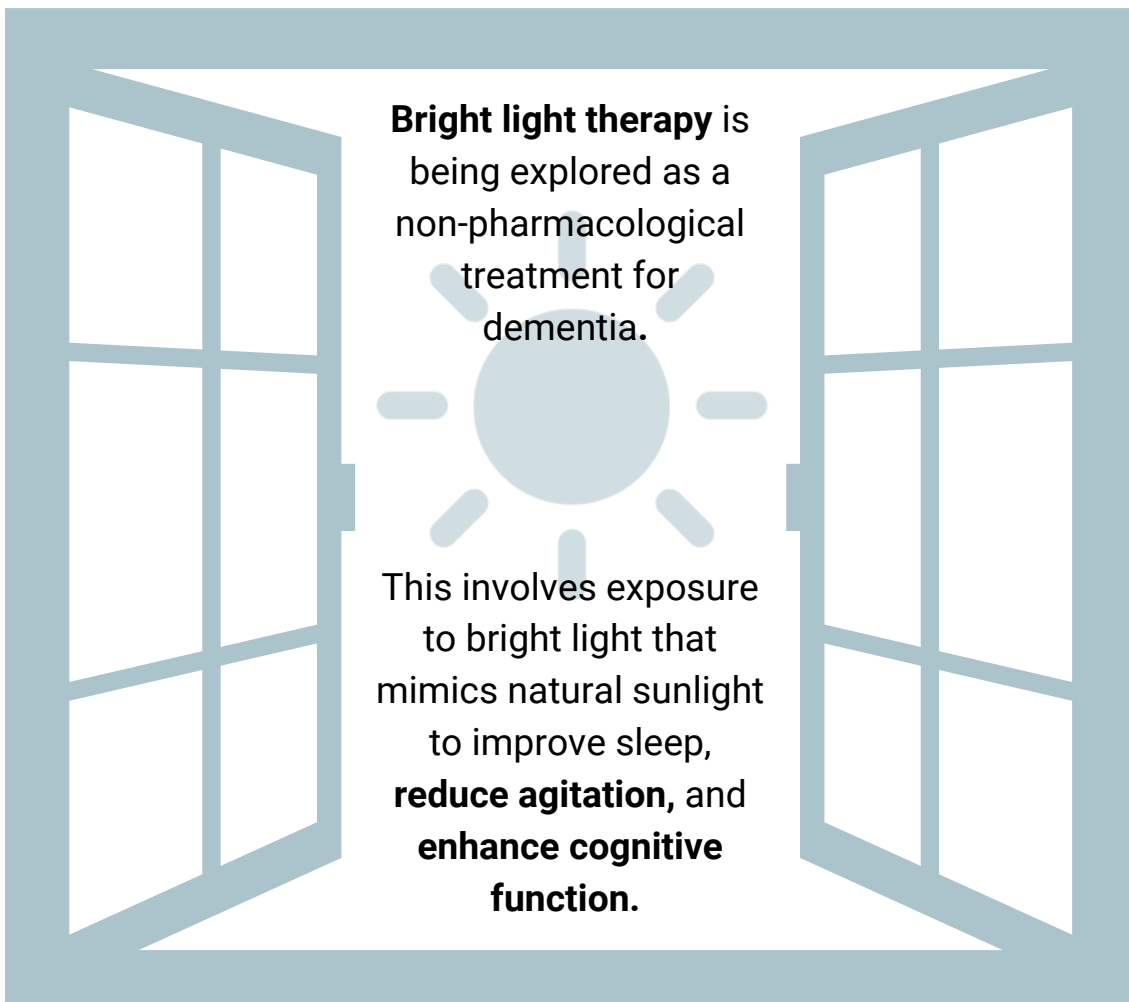
If your normal routine looks a bit different, it's ok to make adjustments:

- If you've always gone to bed and woken up late, this might be the most **natural rhythm** for you.
- If you ate your **main meal at lunch**, this may be how you still want to eat.
- If you like to **listen to the radio** to fall to sleep, this might be good for you.

Healthy Habits for Sleep Light

Consistent exposure to natural light is crucial for regulating the human body's natural biological clock. Without it, you're more prone to sleep disturbances, **daytime fatigue**, and an increased risk for health issues such as **hypertension, diabetes, obesity, depression** and **stroke**.

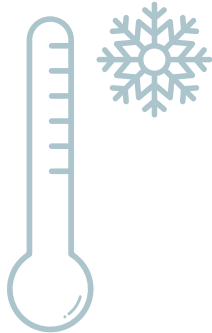
Regular exposure to natural light is also linked to lower risks of dementia. For individuals with dementia, maintaining a **consistent light-dark cycle** is essential for better sleep and cognitive function. Research shows that **outdoor light** can also boost **Vitamin D** levels and improve cognitive functioning, reducing dementia risk.



Bright light therapy could be effective in improving sleep quality and reducing insomnia in individuals with dementia. However, more research is needed before it is routinely recommended.

Healthy Habits for Sleep Environment

Making changes to your home can help, especially if your loved one is experiencing anxiety, confusion, pain or hallucinations. Everyone experiences dementia differently, so consider what works for you.



Cool bedroom
between 18-20°C

Turn off electronics
an hour before bed



Comfortable, supportive bed
in a calm & familiar bedroom



Remove noise
Try earplugs or
play white
noise/calming
music



Remove mirrors
Replace with
familiar pictures



Dark bedroom at night
Close the blinds



Light in the morning
Open the blinds or curtains
at wake up time

Aromatherapy
Scents such as
lavender could have
a calming effect.

Consider a home safety evaluation

Your local Aged Care Assessment Team can advise you on:

- where to place lights
- where to position your bed
- avoiding hazards
- limiting stress, fear and agitation

You can brainstorm ideas and can record what works for you in a diary, or tick off the suggestions in this booklet.

Healthy Habits for Sleep

Avoiding Stimulants

Avoiding stimulants is important for individuals with dementia, as these can worsen behavioural symptoms and interfere with overall wellbeing.

Most importantly, stimulants can disrupt sleep patterns and make falling asleep difficult.

Stimulants can also heighten **agitation and confusion** and trigger **aggression and irritability**.

Due to their propensity to increase hyperactivity and restlessness, stimulants can also increase your **risk of falls**.



It is important to understand the source of stimulants and eliminate these as much as possible, especially in the afternoon and evening.

Possible sources include caffeine from food and beverages such as coffee and tea. Try caffeine-free alternatives instead.

Nicotine is also a stimulant. You may want to seek support to **quit smoking**.

A balanced diet that includes **nutrient-rich foods** and is not high in **sugar** is also important for minimising **energy spikes and crashes**.

Seek advice from a healthcare professional who can provide personalised advice and strategies on minimising stimulants.



Healthy Habits for Sleep Napping

Napping offers several benefits for individuals with dementia, but it needs to be done in a healthy, **controlled way** to avoid disrupting the sleep-wake cycle.



Napping can be useful for **compensating for disturbed nighttime sleep** by reducing daytime sleepiness. This can also help improve cognitive function and behaviour, as well as **reducing stress and anxiety**.

Including naps in a routine will help promote a regular sleep-wake schedule and also help with minimising overall confusion. However, daytime naps that are **too long** or taken **too late in the day** can have some negative effects.

After a long nap, you may wake up feeling groggy. This is called **sleep inertia**. It can make it more difficult to do things well. It may last for a few minutes but can last much longer. This can also temporarily worsen cognitive function in people with dementia.

Naps that are too long also reduce your overall sleepiness, making it more difficult to fall asleep at a normal bedtime, especially if naps are taken later in the day. They can also reduce physical activity during the day, which can impact how sleepy you feel at bedtime.

If you have dementia, these things can help



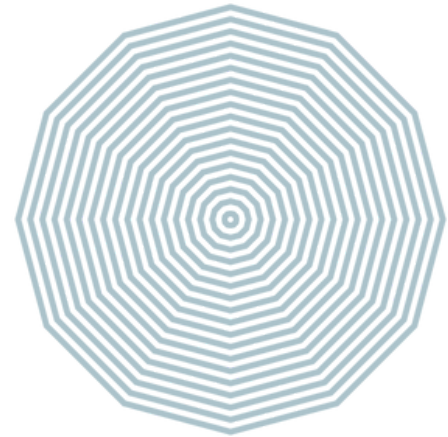
- Allow **20-30 minutes** for naps.
- Don't nap **late in the afternoon**.
- Have a **daily routine** that includes time for a short nap, as early in the day as possible.

Consult with a healthcare provider if napping is significantly impacting overall sleep patterns or wellbeing.

Sleep Medications

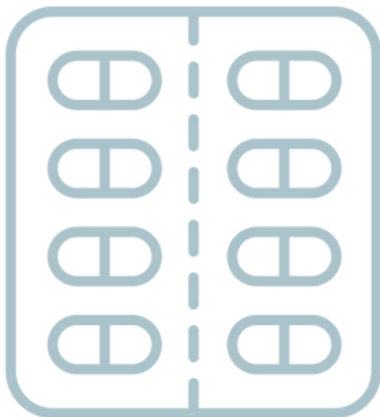
If you're considering sleep medications, it's important to consult with a specialised dementia healthcare provider, who can provide an individualised approach and review your medications regularly.

There are risks in taking some sleep medications – including worsening behavioural symptoms such as **aggression and agitation**, as well as **hallucinations and confusion**.



Sleep medications also increase the **risk of falls**, particularly as people with dementia already have increased difficulty with mobility and coordination.

There is also a greater risk of **interaction with other medications** the person might be taking, potentially leading to adverse effects.



In most cases, a non-pharmacological, or non-drug approach, is advised first. However, melatonin might be a suitable alternative to conventional medications (ask your health professional).

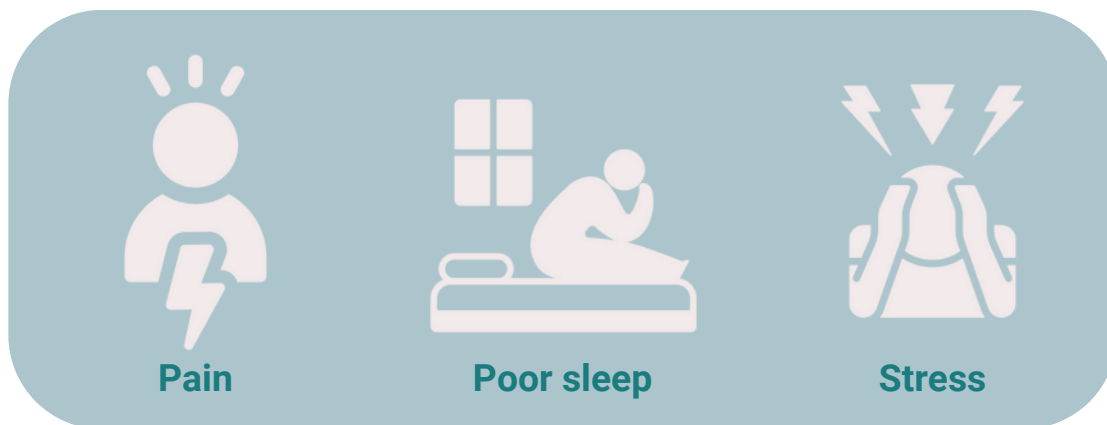
Improving sleep habits to help maintain a regular sleep-wake schedule is the first-line approach in managing sleep disturbances in people with dementia.

This includes managing physical activity, diet, light exposure napping and setting consistent habits and routines.

Sleep & Chronic Pain

Sleep problems are common in people living with chronic pain. It can be hard to fall asleep, stay asleep, or awake feeling refreshed. This can lead to an unhealthy cycle, where pain leads to poor sleep quality, which increases our perception of pain, delays healing, and lowers our energy levels. This in turn makes it hard to exercise, which may further increase the pain. Together with increased stress levels, pain leads to more sleep problems. The unofficial name for this cycle is painsomnia.

The Painsomnia Cycle



As anyone living with chronic pain will tell you, reducing pain is easier said than done. But there are a few strategies that may help break the cycle:

- Act to **reduce pain as soon as possible**, so it's not at its peak at bedtime. Work with your medical team to reduce pain and reliance on sedative medications.
- Develop **healthy sleep habits** and maintain good sleep practices.
- Make your sleeping environment as comfortable as possible. Find the **right mattress and pillow** that help you adopt the best sleeping position.
- **Find support.** There are many social media support groups for people with chronic pain and sleep problems. You are not in this alone!
- Look into **Cognitive Behavioural Therapy for Insomnia (CBT-I)**. CBT-I reduces anxiety and can help you let go of the fear of not sleeping.

Sleep and Carers

Caring for someone with dementia can be very demanding, both physically and emotionally. If carers are not getting enough sleep, their overall wellbeing is likely to be affected, along with their own ability to adequately care for the person with dementia.

Stress, worry and emotional strain can make it difficult to fall asleep or stay asleep. Interrupted sleep is also common if care is needed during the night. This can lead to chronic sleep deprivation, as well as disturbances to the sleep-wake cycle.

As a carer, taking care of yourself is as important as caring for the person with dementia, and will help you better manage the challenges of caregiving.

Here are some strategies that can help:

- **Prioritise self-care** Taking time to engage in activities that promote relaxation and setting aside even a small amount of time each day to do this can reduce stress and anxiety.
- **Share responsibilities** Asking family members to share responsibilities, including scheduling nights off, can ensure that you get an opportunity to take a break. Setting up a schedule of care between family members or other help can minimise stress and facilitate opportunity for sleep.
- **Seek professional help** Talking to your doctor or other healthcare professional can be helpful, as they may be able to give guidance and advice for managing sleep and improving sleep quality.
- **Explore care options** You may also wish to explore respite care options that allow you to have a break and catch up on sleep.
- **Communicate** It is also important to talk openly with family and friends about your needs. While they may not always be able to provide help, feeling listened to and supported can reduce stress and make you feel you're not alone.

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Partners and Contributors



Jeremy Pearson-Lemme



COGSLEEP

CogSleep Academy
CogSleep Chief Investigators



THE UNIVERSITY OF
SYDNEY

Zoe Schrire
Shawn Kong
Isabella Orlando
Aaron Lam
Juliana Chen
Sophie Duke
Moriah Viglione



MONASH
University

Jade Murray
Perna Varma
Elisabeth Lopez



Louise Pivac
Belinda Brown
Kelsey Sewell

