

## **Sleep Deprivation: Symptoms, Treatment, & Effects**

<https://www.sleepfoundation.org/sleep-deprivation>

Sleep deprivation may increase a person's risk of getting in a car crash, making mistakes at work, and experiencing a variety of health problems, including heart problems, reduced immune function, obesity, a lower quality of life, brain damage, and even an earlier death.

About 20% of U.S. adults sleep fewer than five hours each night, even though experts recommend adults sleep for at least seven hours per night, suggesting that many may be negatively impacted by sleep deprivation. We explore symptoms of sleep deprivation, the process of being diagnosed, and tips for preventing and treating this problem.

### **What Is Sleep Deprivation?**

Experts reserve the term sleep deprivation for going a whole night without sleep or sleeping very little for one or two nights. What people often refer to as sleep deprivation in casual conversation is called "sleep insufficiency" by experts. When a person experiences sleep insufficiency, they either sleep for a shorter amount of time than their body requires to stay healthy or have low-quality sleep due to sleep disruptions.

Sometimes people confuse sleep insufficiency and insomnia, since both involve sleeping less than the recommended amount. These two conditions are different, however. With sleep insufficiency, a person is physically able to sleep enough, but their schedule doesn't allow it or for some other reason they aren't given the opportunity. With insomnia, a person has ample opportunity to sleep, but they struggle to fall asleep, stay asleep, or both.

### **Sleep Deprivation Symptoms**

Sleep deprivation and sleep insufficiency can cause many symptoms, including:

- Slower reaction times
- Trouble paying attention
- Difficulty thinking and being logical
- Mood changes, including irritability
- Anxiety
- Depression
- Poor judgment
- Brief daytime sleep periods, also known as microsleeps
- Unplanned naps
- Lower quality of life
- Reduced social activity due to tiredness

When a person experiences sleep deprivation or insufficiency because they haven't been sleeping enough each night, they may sleep longer on their days off of work or days without social plans. If a

person sleeps much longer than usual on weekends or vacations, that could be a sign they aren't getting enough sleep on regular nights.

## How Sleep Deprivation Happens

Many factors can contribute to sleep deprivation and insufficiency. Sometimes poor sleep habits play a role in falling short on sleep. For example, an inconsistent sleep schedule, long daytime naps, the use of digital devices before bed, and a noisy or bright sleep environment can all interfere with a person's ability to get the sleep they need.

A person's work schedule or social obligations can also contribute to sleep deprivation. Sometimes substances a person consumes, like caffeine, alcohol, and nicotine, lead to obtaining less sleep. Various illnesses, including sleep disorders, and prescription medications can also cause a person to fall short on sleep.

*"Sleep deprivation is a high interest loan with steep payments in the form of health consequences."*

— Abhinav Singh, MD, MPH, FAASM, Sleep Medicine Physician

## Effects of Sleep Deprivation

Sleep deprivation and insufficiency can cause many negative effects, especially if they continue over time.

**Mental impairment:** A person who isn't getting enough sleep becomes less alert and struggles to focus their attention. Reaction times become slower, logical reasoning worsens, and the ability to perform tasks like reading complex sentences and doing simple math worsens. These changes occur after even one night of short sleep.

**Microsleeps and tiredness:** When a person is sleep-deprived or very tired during the day, they may experience microsleeps. A microsleep involves falling asleep without planning to for a short period, such as for only a few seconds. Microsleeps can be very dangerous if they occur while a person is driving.

**Car crashes and work mistakes:** Because of the mental impairment and microsleeps caused by sleep deprivation, people who are short on sleep face a higher risk of car crashes and errors at work.

**Health problems:** Not getting enough sleep or good enough quality of sleep can lead to many health problems, including heart problems. Sleep insufficiency may also cause inflammation and reduce the immune system's ability to fight infections. Short sleep is also linked to obesity, a slower metabolism, and death of any cause.

## **Can Sleep Deprivation Cause Brain Damage?**

Authors of a 2023 research study on sleep disruption resulting from internet addiction concluded that decreased sleep in adolescents with internet addiction could potentially cause brain injury. They came to this conclusion by comparing their research participants' sleep survey scores with their levels of S100 calcium-binding protein B (S100B) and neuron-specific enolase (NSE), two substances in the body considered to be markers of brain injury.

A previous study had found that having healthy young men go a full night without sleep resulted in 20% higher levels of S100B and NSE the next morning compared to young men who had slept 8 hours. The study authors say neuronal damage, another term for brain damage, could be one possible explanation for the increase in these measures.

Studies have also found that sleep deprivation can reduce the amount of enzymes capable of repairing brain damage. That said, some animal studies have produced contradictory results, finding that long-term sleep deprivation doesn't cause brain damage in rats. While sleep deprivation seems to clearly impact the brain, researchers are still figuring out exactly what impact it has and how that impact occurs. Whether or not sleep deprivation definitively causes brain damage isn't yet known, but it's clear that the brain benefits from adequate sleep.

## **Can You Die From Sleep Deprivation?**

While it is uncommon for people to die directly from a lack of sleep, chronic sleep deprivation can contribute to a range of health problems that may become life-threatening. Sleep deprivation also increases the risk of serious car crashes, falls, and workplace accidents due to the associated cognitive impairments.

## **How Is Sleep Deprivation Diagnosed?**

Doctors diagnose insufficient sleep syndrome, which includes sleep deprivation, when a person meets six criteria.

- Falls asleep during the day
- Sleeps less than recommended for their age group
- Sleeps less than recommended most nights for at least three months
- Wakes up due to an alarm or another person when they could continue sleeping
- Symptoms resolve when they can sleep more
- Symptoms aren't caused by a sleep disorder, a health problem, or drug use or withdrawal

A doctor usually begins checking if a person has sleep deprivation or sleep insufficiency by asking about their history. Questions may be about sleep and wake patterns, work schedules, sleep quality, daytime napping habits, and fatigue or tiredness. They may also ask a person to keep a sleep diary, which is a log of daily sleep patterns. An actigraphy can also be used when a sleep diary is difficult to keep or doesn't provide answers. An actigraphy is a watch-like device that provides insights about sleep by recording movement.

A doctor may also ask about other symptoms, in order to rule out sleep disorders and other illnesses. If another disorder is suspected, further testing, including a sleep study, may be recommended.

### **Sleep Deprivation Treatment and Prevention**

The best way to treat and prevent sleep deprivation is to get enough sleep. Experts recommend that adults sleep for at least seven hours each night. The ideal amount of sleep varies from person-to-person though, and some people could need up to nine hours or even more. Here are tips for getting adequate sleep:

- Go to sleep and wake up at the same time every day
- Follow a calming bedtime routine every night in the hour or two before bed
- Avoid using digital devices before bed and during any nighttime awakenings
- Only take daytime naps that are shorter than 30 minutes
- Engage in exercise every day for at least 20 minutes
- Keep the bedroom dark, cool, and quiet
- Choose a mattress, bedding, and pillows you find comfortable
- Avoid caffeine, alcohol, and nicotine in the evening

If following these tips doesn't help, experts recommend seeing a doctor to determine what might be causing your short sleep, daytime tiredness, and any other symptoms.