

Lack of Sleep Can Cancel the Benefits of Exercise

Analysis by [Dr. Joseph Mercola](#)

✓ Fact Checked

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STORY AT-A-GLANCE

- › Sleep and exercise impact cognitive performance and decline. However, data suggest that higher-intensity physical activity is not enough to mitigate the rapid cognitive decline that is associated with insufficient sleep
- › A suboptimal number of sleep hours can increase your risk of cardiovascular disease, anxiety, depression, weakened immune system, migraine headaches, poor athletic performance, loss of bone mass, visible signs of aging, traffic accidents, poor decision-making and more
- › One study found the financial cost of insufficient sleep and sleep deprivation is 2% of a country's gross domestic product (GDP), which for the U.S. is \$411 billion. This could nearly double the education budget or pay half the deficit for health care
- › Light and darkness significantly affect your sleep-wake cycles. The suprachiasmatic nuclei in your brain synchronize the circadian clock and are affected by light and dark. Wearing a sleep mask may lower your heart rate and improve your morning insulin sensitivity
- › Nutrient deficiencies can also impact sleep quality and quantity, including vitamins B12, C and D. Vitamins B12 and D work in concert to improve your gut microbiome where most B vitamins are produced

If you intend to live a long and healthy life, you must make sleep a priority. Data now show that without adequate sleep, cognitive performance in active people in their 50s and 60s declines.¹ Sleep is one of the great mysteries of life. For a long time, people

believed that sleep might be little more than a waste of time. However, research has demonstrated sleep is a crucial component of a healthy lifestyle.

In 2018, 51.8% of the U.S. population who were noninstitutionalized, civilian adults had at least one of 10 chronic conditions measured by the CDC.² In other words, when you include other chronic illnesses not measured in the study as well as military personnel and institutionalized adults, that percentage would rise.

Poor sleep not only contributes to the problem of chronic disease but can also counteract any lifestyle strategies you're using to address your illness. One of the most radical and recent discoveries revealing the importance of sleep found that every organ, indeed every cell, has its own biological clock.

The 2017 Nobel Prize in Physiology or Medicine³ was awarded for the discovery of these cellular clocks, all of which work in tandem to control and maintain biological homeostasis, regulating everything from metabolism to psychological functioning. As a general guideline, healthy adults should seek to get close to eight hours of sleep each night.

Sleep deprivation not only impacts chronic conditions, but it also slows your reaction time and increases your risk of accidents. Getting less than six hours of sleep leaves you cognitively impaired and even a single night of sleeping only four to six hours can impact your ability to clearly think the next day. Researchers now link insufficient sleep to mitigating exercise benefits on cognitive health.⁴

Sleep, Exercise and Cognitive Decline

In 2011, the first meta-analysis⁵ to evaluate the role that physical activity plays in cognitive decline was published in the Journal of Internal Medicine. The researchers found there was a significant and consistent link between all levels of physical activity and cognitive decline.

In the following years, peer-reviewed studies⁶ found that several types of exercise⁷ may have a neuroprotective effect on cognitive decline,⁸ may be considered a preventive

approach to Alzheimer's disease⁹ and may help those with dementia.¹⁰ Adequate amounts of sleep is another strategy that has neuroprotective effects and helps the brain maintain normal functioning.¹¹

As you sleep, your brain improves memory recall, regulates metabolism and removes toxic waste byproducts.¹² During a Joe Rogan interview¹³ with Matthew Walker, Ph.D., founder and director of the University of California Berkeley Center for Human Sleep Science, Walker recounted the story of disc jockey Peter Tripp who, in 1959, tried to break the world record for sleeplessness.

He stayed awake for eight days doing a continuous broadcast from Times Square, during which he experienced psychotic hallucinations and delusions. After 201 consecutive hours of being awake,¹⁴ Tripp finally went to bed and slept for 24 hours. After waking he reported feeling normal, but his wife, friends and family disagreed, saying that he changed.

Attending psychiatrists agreed that his personality had changed, and that change appeared to be permanent. The couple eventually got divorced and arguments with his boss led to the loss of his job. Those who knew him best said those eight days of sleep deprivation cause long-term damage.

Scientific evidence has demonstrated that both sleep and exercise have an impact on cognitive function, and optimal sleep and exercise can reduce cognitive decline. In a 2023 study,¹⁵ scientists looked at how the relationship between sleep and exercise might impact cognitive decline.

Researchers from University College London examined the association between physical activity and sleep duration in 8,958 participants over 10 years. The data were collected from the English Longitudinal Study of Aging, during which participants were interviewed every two years.

The researchers evaluated episodic memory using recall tasks and verbal fluency using animal naming tasks. They found that participants with lower levels of physical activity and suboptimal sleep had worse performance on the cognitive tests and those who

slept the least exhibited faster cognitive decline. Interestingly, the participants who had higher levels of physical activity and shorter sleep times also had faster rates of cognitive decline.

Those who had higher levels of physical activity and slept an optimal number of hours had the slowest cognitive decline. Overall, the data suggested that higher-intensity physical activity was not enough to mitigate the rapid cognitive decline that is associated with insufficient sleep.

Sleep Crucial for Cognitive Health and More

There are very few physiological processes that are unaffected when you skimp on sleep. With every passing year, the list of health problems associated with poor sleep or lack of sleep keeps growing. Poor or insufficient sleep has been linked to:¹⁶

Cardiovascular disease	High blood pressure
Increased risk of obesity and Type 2 diabetes	Poor cognitive functioning
Anxiety and depression	Premature all-cause mortality
Weakened immune system and increased susceptibility to upper respiratory tract infections	Cancer
Increased risk of migraine headaches	Poor athletic performance ¹⁷
Loss of bone mass that may lead to osteoporosis ¹⁸	Impaired sexual function ¹⁹
Increased visible signs of aging ²⁰	Poor learning and academic performance
Increased traffic and industrial accidents	Deterioration in decision making

Severely impaired moral reasoning

Irritability, frustration, poor attention span
and poor motivation

Poor organizational skills

The High Cost of Losing Sleep

While there are many reasons you may sleep poorly, have you considered that your poor sleep patterns may be related to how you think about sleep? Many people still see a lack of sleep as a badge of honor. It represents a sign of high drive, ambition and achievement. Worse, optimal sleep may be characterized as a sign of sloth or being lazy. In his interview with Rogan, Walker noted:²¹

"Human beings are the only species that deliberately deprive themselves of sleep for no apparent reason ... That's why we get such demonstrable disease, sickness and impairment when you undergo a lack of sleep ...

The only way that you can get a species to sleep less, and it's very, very difficult to do because sleep is just so essential, is when you put them under conditions of extreme starvation. They will forgo some sleep to stay awake so that they forage in a larger sort of circumference area to try and find more food."

According to a Gallup Poll,²² Americans slept an average of 7.9 hours each night in 1942. According to Walker, today that is 6 hours and 31 minutes for the average person, which as he points out, "that means that there's a huge swath of people well below that average."²³

Walker also talks about the cost of insufficient sleep and sleep deprivation in the world. His goal is to influence first-world governments so that sleep becomes part of public health campaigns around the world²⁴ since lack of sleep is having significant physical and financial impacts.

"The RAND Corporation did an independent survey two years ago on the demonstrable cost of a lack of sleep to global economies [and] what they found was that a lack of sleep costs most nations about 2% of their GDP, the gross domestic product.

Here in America, that number was \$411 billion caused by insufficient sleep. Solve the sleep loss epidemic, you could almost double the budget for education and you could almost half the deficit for health care."

When asked by The Guardian if he takes his own advice about sleep, Walker replied:²⁵

"I give myself a non-negotiable eight-hour sleep opportunity every night, and I keep very regular hours. If there is one thing I tell people, it's to go to bed and to wake up at the same time every day, no matter what. I take my sleep incredibly seriously because I have seen the evidence.

Once you know that after just one night of only four or five hours of sleep, your natural killer cells – the ones that attack the cancer cells that appear in your body every day – drop by 70 percent, or that a lack of sleep is linked to cancer of the bowel, prostate and breast ... how could you do anything else?"

Harness Light and Dark for Better Sleep

Light and darkness significantly affect your sleep-wake cycles. Before electricity, people typically got up with the sun and fell asleep in near-complete darkness. Now, light exposure at night is virtually inevitable from televisions, computers, cell phones and artificial indoor and outdoor lighting. Yet, light is a major factor in synchronizing your body's master clock, which is a group of cells in your brain called the suprachiasmatic nuclei.

These nuclei synchronize the light-dark cycle in the environment as certain wavelengths of light enter the eyes. A 2023 study²⁶ looked at how wearing eye masks at night may improve episodic learning and alertness during the day. These researchers noted that

there is a clear and large body of evidence that supports the impact light has on sleep duration, timing and quality.

I've long advised that making a conscious effort to eliminate light in your bedroom — and if you can't, wearing a sleep mask — can go a long way toward protecting your health. In March 2022, a study²⁷ of 20 healthy young adults revealed that even one night of sleep with moderate light exposure increased nighttime heart rate, decreased heart rate variability and increased next-morning insulin resistance.

A 2019 study,²⁸ involving 43,722 women, also found that exposure to artificial light at night while sleeping was significantly associated with an increased risk of weight gain and obesity. In another study,²⁹ exposure to any amount of light at night was linked to detrimental effects on the health of older adults, increasing the risk of obesity, high blood pressure and diabetes.

Once you understand the importance of light and sleep, you can learn to harness the differences to improve your sleep quality. Andrew Huberman is a neuroscientist and tenured professor in the department of neurobiology at Stanford University School of Medicine. In his Sleep Tool Kit podcast in 2022,³⁰ Huberman recommends getting sunlight within the first 30 to 60 minutes after waking up, which can help you fall asleep better at night.

This exposure triggers a cortisol peak early in the day. He then recommends changes to your schedule at 6 p.m. or 7 p.m., depending on when you go to sleep.³¹ He calls this critical period No. 3 in a 24-hour cycle. During this time, you want to avoid bright artificial lights of any color and use as little artificial light as necessary to carry out your evening activities.

Severely reducing or eliminating light exposure at night also improves sleep quality and boosts memory and alertness. The 2023 sleep mask study is unique in that it measured the effects of sleep masks on an ordinary night at home.

The researchers found that those who wore sleep masks all night had "Superior episodic encoding and an improvement on alertness."³² The participants also performed better on

reaction time tests and word pair association tests, which measure the ability to recall events and experiences.³³

Nutrient Deficiencies Associated With Impaired Sleep Quality

While you might be aware that there are herbs that can help you relax and go to sleep, you might not know that certain nutrient deficiencies can impair your ability to sleep. There are three vitamins known to influence the quality of sustained sleep you can get. These include:

- **Vitamin D** – Several studies have linked low vitamin D to poor sleep quality,³⁴ and have shown that reaching and maintaining a vitamin D level of 60 to 80 ng/mL can improve sleep.³⁵ According to the authors:

"Comparisons of brain regions associated with sleep-wake regulation and vitamin D target neurons in the diencephalon and several brainstem nuclei suggest direct central effects of vitamin D on sleep. We propose the hypothesis that sleep disorders have become epidemic because of widespread vitamin D deficiency."

- **Vitamin C** – Research³⁶ published in PLOS ONE found those with low vitamin C in their blood reported more trouble sleeping and were more likely to experience interrupted sleep. Foods high in vitamin C include³⁷ guava, red and green bell pepper, kiwi, oranges, strawberries, papaya and broccoli. If opting for a supplement, I'd recommend liposomal vitamin C, as it has better absorption.
- **Vitamin B12** – Low B12, which is extremely common in the general population but even more so among vegans and vegetarians, is known to cause neurological problems, including disturbed sleep. Part of the challenge may be that an imbalanced gut microbiome³⁸ does not properly make vitamin B12, resulting in a deficiency.

In my interview³⁹ with Dr. Stasha Gominak,⁴⁰ neurologist and sleep coach, she discovered that the more her patients slept, the more they needed B vitamins. She

recognizes the intimate relationship between the ability of a healthy gut microbiome to produce B vitamins and optimal vitamin D levels.

To optimize her patients' gut microbiome, she recommends a **vitamin D level above 40 ng/mL** and taking a B50 or B100 supplement for three months to help restore a healthy microbiome and produce ideal amounts of B vitamins.

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