

# Sleep deprivation and its ill effects

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sleep deprivation and its ill effects Sleep deprivation is the condition of not having enough sleep; it can be either chronic or acute. A chronic sleep-restricted state can cause fatigue, daytime sleepiness, clumsiness and weight loss or weight gain. It adversely affects the brain and cognitive function. Few studies have compared the effects of acute total sleep deprivation and chronic partial sleep restriction. Complete absence of sleep over long periods is impossible for humans to achieve (unless they suffer from fatal familial insomnia); brief microsleeps cannot be avoided. Long-term total sleep deprivation has caused death in lab animals. Generally, sleep deprivation may result in:

- aching muscles
- confusion, memory lapses or loss
- depression
- hallucinations
- hand tremors
- headaches
- malaise
- stye
- sensitivity to cold
- periorbital puffiness, commonly known as "bags under eyes" or eye bags
- increased blood pressure
- increased stress hormone levels
- increased risk of diabetes
- increased risk of fibromyalgia
- irritability
- nystagmus (rapid involuntary rhythmic eye movement)
- obesity
- temper tantrums in children
- yawning
- symptoms similar to:

- o Attention-deficit hyperactivity disorder (ADHD)
- o Psychosis [edit]

Diabetes In 2005, a study of over 1400 participants showed that participants who habitually slept few hours were more likely to have associations with diabetes type 2. [edit]

Effects on the brain Sleep deprivation can adversely affect the brain and cognitive function. A 2000 study, by the UCSD School of Medicine and the Veterans Affairs Healthcare System in San Diego, used functional magnetic resonance imaging (fMRI) technology to monitor activity in the brains of sleep-deprived subjects performing simple verbal learning tasks. The study showed that regions of the brain's prefrontal cortex, an area that supports

mental faculties such as working memory and logical and practical ("means-ends") reasoning, displayed more activity in sleepier subjects. [edit] Effects on growth A 1999 study found that sleep deprivation resulted in reduced cortisol secretion the next day, driven by increased subsequent slow-wave sleep. Sleep deprivation was found to enhance activity on the hypothalamic-pituitary-adrenal axis (which controls reactions to stress and regulates body functions such as digestion, the immune system, mood, sex, or energy usage) while suppressing growth hormones. The results supported previous studies, which observed adrenal insufficiency in idiopathic hypersomnia.

[edit] Impairment of ability The dangers of sleep deprivation are apparent on the road; the American Academy of Sleep Medicine (AASM) reports that one in every five serious motor vehicle injuries is related to driver fatigue, with 80, 000 drivers falling asleep behind the wheel every day and 250, 000 accidents every year related to sleep According to a 2000 study published in the British Medical Journal, researchers in Australia and New Zealand reported that sleep deprivation can have some of the same hazardous effects as being drunk.[30] People who drove after being awake for 17–19 hours performed worse than those with a blood alcohol level of . 05 percent, which is the legal limit for drunk driving in most western European countries and Australia. Another study suggested that performance begins to degrade after 16 hours awake, and 21 hours awake was equivalent to a blood alcohol content of . 08 percent, which is the blood alcohol limit for drunk driving in Canada, the U. S., and the U. K. [edit] Microsleeps Microsleeps occur when a person has a significant sleep deprivation. The brain automatically shuts down, falling into a sleep state for a period that can last from a fraction of a

second up to half a minute. The person falls asleep no matter what activity he or she is engaged in. [edit] Gene regulation A sleepless week down-regulated 444 genes, and up-regulated 267. Genes that were affected are related to circadian rhythms, metabolism, inflammation, immune response and stress. Some sleep deprivation techniques are as follows: - Gentle handling: During the sleep deprivation period, the animal and his/her polysomnograph record are continuously observed; when the animal displays sleep electrophysiological signals or assumes a sleep posture, he/she is given objects to play with and activated by acoustic and if necessary tactile stimuli. Although subjective,[54] this technique is used for total sleep deprivation as well as REM or NREM sleep deprivation. This technique often requires polysomnography. - Single platform: During the sleep deprivation period, the animal is placed on an inverted flower pot, the bottom diameter of which is small relative to the animal's size (usually 7 cm for adult rats). The pot is placed in a large tub filled with water to within 1 cm of the flower pot bottom. The animal is able to rest on the pot and is even able to get NREM sleep. But at the onset of REM sleep, with his/her ensuing muscular relaxation, he/she will either fall into the water and clamber back to his/her pot or will get his/her nose wet enough to awaken him/her. Thus, this technique is only useful for studying REM sleep deprivation. This was one of the first scientific methods developed (see Jouvet, 1964 for cats and for rodents). - Multiple platform: In an effort to reduce the elevated stress response induced by the single platform method, researchers developed the "multiple platform" technique of REM sleep deprivation. In this configuration, the animal is placed within a large tank containing multiple platforms,

thereby eliminating the movement restriction in the earlier setup. - Modified multiple platform: Modification of the multiple platform method where several animals together experience sleep deprivation (Nunes and Tufik, 1994). - Pendulum: Animals are prevented from entering into REM sleep by allowing them to sleep for only brief periods of time. This is accomplished by an apparatus that moves the animals' cages backwards and forwards in a pendular motion. At the extremes of the motion, the animals experience postural imbalance, forcing them to walk back and forth to retain their balance.