

# Good Sleep, Good Health

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## ABSTRACT

Published on 1<sup>st</sup> July 2024

Good sleep is not a luxury but an essential requirement for physical, mental and emotional health. Prioritising quality sleep is essential for overall health and well-being. From cognitive function to emotional regulation, the benefits of sufficient sleep are undeniable. Insufficient sleep adversely affects the functioning of various vital systems in our body. Practising sleep hygiene is essential for ensuring adequate and quality sleep thus resulting in maintaining good health.

**Keywords:** Good Sleep, Health, Sleep Cycle, Insufficient Sleep, Sleep Hygiene Introduction

\*See End Note for complete author details

Sixty years ago, most houses in Kerala relied on kerosene lamps rather than electric lights. As a result, most people went to bed around 8 PM and woke up by 6 AM, ensuring they slept for 9 to 10 hours daily. Fast forward to 2024, and the drastic lifestyle changes mean that even children now sleep for only six hours or less.

Sleep is one of the basic biological necessities for a healthy life, akin to breathing, drinking, and eating. Unfortunately, in the modern world, many people view sleep as a luxury rather than an essential requirement for health. There is a common misconception among youngsters that lost sleep can be compensated by sleeping more later. This belief is far from the truth. One cannot accumulate sleep and make up for lost sleep during the weekdays by sleeping more during the weekend. Sleep is an integral part of our "Circadian Rhythm," the 24-hour biological clock that regulates all our metabolic activities.<sup>1</sup> It is crucial to note that this biological clock is closely related to the cycle of daylight and darkness.

## WHY SHOULD WE SLEEP WELL?

Many people believe that sleep is merely a period of rest due to the lack of activities at night. However, several crucial biological activities, particularly in the brain, occur during sleep.

Here are some important processes that happen during deep sleep:

- 1. Clearance of Accumulated Waste Products from the Brain Neurons:** Any metabolic activity produces harmful waste materials inside our cells, especially in the neurons of the brain. For instance, the accumulation of beta-amyloid and tau proteins is observed in sleep-deprived individuals. These same proteins are also found in excess in individuals affected by Alzheimer's, indicating that lack of sleep could be a contributing factor to early senile dementia and Alzheimer's.
- 2. Healing and Repair of Damaged Cells:** Injuries heal primarily at night because anabolic hormones, including Human Growth Hormone (HGH), are secreted mainly during deep sleep. Studies have shown that osteoporosis occurs much earlier in people who do not get enough sleep.
- 3. Brain Activity During Sleep:** While most organs rest with minimal metabolism during sleep, certain parts of the brain are more active during deeper sleep stages like NREM 2, 3, 4, and REM. It is during these stages that data stored as temporary memory in the Hippocampus is filtered and transferred to the frontal lobe as permanent memory. Unpleasant and unimportant memories are gradually erased

Cite this article as: Panicker CJ. Good Sleep, Good Health. Kerala Medical Journal. 2024 Jul 1;17(2):113-5.

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during these NREM phases, reducing stress levels.

**4. Learning and Memory Consolidation:** During sleep, especially REM sleep, the brain integrates new information with existing knowledge through the formation of new synaptic connections. This process, known as synaptogenesis, is crucial for learning and memory.

**5. Emotional Maturity and Creativity:** REM sleep is essential for emotional maturity and creativity. A lack of adequate sleep is believed to be a significant factor in the increase in dilemmas and problems among adolescents and young adults. Many succumb to drug abuse, engage in criminal behavior, or experience high rates of suicide. Shortened sleep duration, particularly in the early morning, deprives children and youth of vital REM sleep.

## HOW IS SLEEP INDUCED?

Sleep is part of our circadian rhythm, a 24-hour cycle that controls all metabolic activities. This biological clock is regulated by the suprachiasmatic nucleus (SCN) in the hypothalamus, located just above the optic chiasma.<sup>2</sup> The SCN receives visual information and analyzes diurnal variations. As darkness sets in, the SCN directs the pineal gland to produce melatonin, peaking around 9-10 PM. In the morning, adenosine levels peak, and body temperature drops, aiding sleep induction.

## SLEEP CYCLE AND STAGES

Sleep comprises different stages based on depth and EEG changes, divided into Non-REM (NREM) and REM (Rapid Eye Movement) sleep. NREM is further divided into three stages.

- NREM Stage 1 (N1): Light sleep with slowed EEG waves (theta rhythm, 4-7 Hertz).
- NREM Stage 2 (N2): Muscle relaxation and occasional high-frequency sleep spindles and K-complexes on EEG.
- NREM Stage 3 (N3): Deepest sleep with slowed EEG waves (delta waves, 1-3 Hertz), muscle relaxation, and reduced respiratory and heart rates.
- REM Sleep: EEG similar to wakefulness, known as “Dream Sleep” due to the prevalence of dreams. New synaptic connections form during this stage, essential for emotional maturity and creativity.

Each sleep cycle lasts around 90 minutes, with REM

duration increasing in the second half of the night, making early morning sleep crucial for brain maturation in children.

## How Long Should a Person Sleep?<sup>3</sup>

Sleep is a biological necessity, and the required duration varies with age. Infants sleep 18 to 22 hours, reducing to around 10 hours by age 10. Teenagers need about nine hours, but many sleep less than six. Adults require at least 7-8 hours, and older adults should aim for seven hours despite aging reducing sleep duration. Contrary to some beliefs, six hours is not enough for healthy living.

## Health Issues of Insufficient Sleep

Insufficient sleep significantly affects brain function, causing stress, memory impairment, irritability, emotional outbursts, migraines, tension headaches, and strokes. Cardiovascular issues like hypertension, arrhythmias, and ischemic heart diseases are common. Endocrine abnormalities, including diabetes, obesity, autoimmune disorders, impotence, osteoporosis, fatty liver, and Steato hepatitis, are prevalent in those lacking sleep.

Insufficient sleep increases appetite hormone Ghrelin and decreases satiating hormone Leptin, leading to obesity. Premature aging, reduced immunity, and serious infections are common, reducing life expectancy.

## Snoring and Sleep

Snoring and obstructive sleep apnea (OSA) are increasing health issues worldwide. Snoring without health issues may be simple, but snoring with hypoxia and OSA can have severe consequences, including silent death.

Factors leading to snoring include anatomical variations, functional variations like hypotonia of pharyngeal and tongue muscles, stressful situations, alcoholism, sedative medications, and conditions like LPRD. Anatomical reasons include deviated septum, nasal and nasopharyngeal polyps, tumors, adenoid hypertrophy in children, oropharyngeal and hypopharyngeal tumors, micrognathia, hypertrophic tongue, and obesity.

Severe snorers tend to be obese, leading to increased LPRD and worsening snoring and OSA. Refractory hypertension, diabetes, increased adrenaline and cortisol levels, cardiac arrhythmias, sudden death, recurrent aspirations, and COPD are common in severe snorers.<sup>4</sup> Snoring should be managed early.

## How to Improve Your Sleep

Both duration and depth of sleep are crucial for health. Many insomniacs resort to sleeping pills, but these do not provide deep or REM sleep. Sleep hygiene practices and Cognitive Behavioral Therapy for Insomnia (CBT-I) are recommended for chronic insomnia.<sup>5</sup>

## SLEEP HYGIENE TECHNIQUES

1. Develop a regular sleep schedule.
2. Address any physical or mental illnesses.
3. Be aware of medications that affect sleep.
4. Avoid stress-inducing thoughts and arguments in the evening.
5. Avoid screens emitting blue light at least two hours before bedtime.
6. Have a light dinner 2-3 hours before bedtime.
7. Engage in regular exercise, preferably outdoors and in sunlight.
8. Limit caffeine and alcohol intake, especially in the evening.
9. Avoid strenuous mental activities before bedtime and engage in relaxing activities.
10. Use the bedroom only for sleep and keep lighting dim.
11. Take a bath before bed to help reduce body temperature.

In conclusion, good sleep is not a luxury but a necessity for physical, mental, and emotional health. Prioritizing quality sleep is essential for overall well-being. By practicing simple sleep hygiene techniques, one can harness the power of restorative sleep and improve quality of life. Medical professionals should also embrace the importance of good sleep to live healthily until the end.

## END NOTE

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**Conflict of Interest:** None declared

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