Sleep Deprivation

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KEYWORDS

• Sleep deprivation • Sleep • Physician fatigue • Residency program • Hospitalist • Fatigue management • Pregnancy

KEY POINTS

- Sleep deprivation occurs when inadequate sleep leads to decreased performance, inadequate alertness, and deterioration in health.
- Energy conservation, restoration, and information processing are different theories as to why humans need sleep.
- Sleep deprivation has many deleterious effects, including increased risk for stroke, obesity, diabetes, cancer, permanent cognitive deficits, osteoporosis, cardiovascular disease, and mortality.
- During pregnancy, sleep deprivation increases the risk for preeclampsia, gestational diabetes, intrauterine growth restriction, and need for cesarean delivery.
- Physicians who work recurrent 24-hour shifts make 36% more medical errors, double their risk for motor vehicle crash when driving home, have less empathy for patients, and have an increase in family and marital stress.
- Hospitalist programs are structured to enhance patient safety, decrease malpractice risk, and improve the physician's quality of life.

INTRODUCTION

Sleep deprivation occurs when inadequate sleep leads to decreased performance, inadequate alertness, and deterioration in health. Sleep deprivation is extremely common, with 20% of the adult population reported to be sleep deprived. Inadequate sleep is due to either decreased quantity or impaired quality of sleep. Typically, a decrease in quantity of sleep occurs over multiple nights. If chronic, loss of sleep results in a sleep debt, which cannot be recovered.[1] Although the amount of sleep required varies from person to person, on average, 7 to 8 hours of sleep are needed per night to function without impairment. Even if a person sleeps more than 8 hours nightly, sleep deprivation may still occur if the quality of this sleep is poor. Sleep quality

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is determined by the number of arousals, or awakenings from sleep, during the night. Five or more arousals can lead to daytime sleepiness.[2]

Pregnant women and obstetrician-gynecologists (OB/GYNs) themselves are affected by sleep deprivation, and signs and symptoms of this disorder must be recognized to optimize the care of our patients as well as ourselves.

WHY DO HUMANS SLEEP?

Sleep is typically defined as a state of reduced responsiveness, motor activity, and metabolism. It is distinguished from coma or anesthesia by its rapid reversibility. Despite the fact that humans spend one-third of their life sleeping, why sleep is needed remains poorly understood. It is theorized that sleep fulfills some universal virtual function that is yet unknown.[3]

Sleep can be categorized into 2 alternating cycles: rapid eye movement (REM) sleep and non-REM (NREM) sleep. Each night, 5 cycles of sleep typically occur. Most adults begin sleep from the drowsy state (NREM). NREM is divided into 3 substages: stage N1, stage N2, and stage N3 (**Fig. 1**, **Table 1**).

- Stage N1: Transition from wakefulness to sleep. Eye movements are slow and rolling. This stage is the lightest stage of sleep. If one awakens from stage N1 sleep, the individual may not perceive that he or she was ever asleep.[4]
- Stage N2: This stage comprises the greatest percentage of total sleep time (50% of the night). Electroencephalography (EEG) frequency slows, thus leading to deeper sleep.
- Stage N3: Deep sleep. This stage accounts for 10% to 20% of sleep time. EEG frequency is at its slowest during this stage. It is most difficult to awaken during this stage of sleep.
- REM sleep: REM sleep may also be called stage R. An EEG during REM sleep resembles that of an active, awake person. Because of the similarity to wakefulness, REM sleep is also called paradoxic sleep.[5] It is during REM sleep that vivid dreaming occurs. Only 20% of sleeping time is in REM stage, and the function of this stage is unclear.[2]

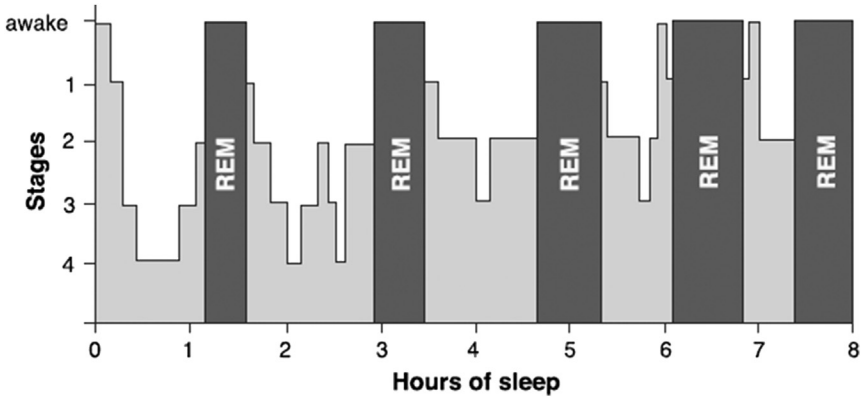

Fig. 1. Typical hypnogram from a young, healthy adult. Light-gray areas represent NREM sleep. (*From* Biological Sciences Curriculum Study. Sleep, sleep disorders, and biological rhythms. Bethesda (MD): National Institutes of Health; 2003. NIH publication no. 04-4989.)