

## CHANGES OF OUR SLEEP PATTERN AS WE AGE

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- We spend 1/3 of our life at sleep.
- Sleep is still the mystery of medical science.
- Sleep architecture also varies across the lifespan. Newborn infants sleep 16 to 18 hours per day in short blocks of time, without a clear circadian phase. They tend to enter sleep through REM as opposed to NREM sleep. Around three months of age, they begin to develop a day/night cycle and enter sleep through NREM sleep. Total sleep time slowly decreases, eventually reaching adult norms post-adolescence. Young adults typically sleep approximately eight hours per night with an elevated percentage of stage N3 sleep; as human's transition to middle age and beyond, the percentage of N3 decreases.
- Insufficient sleep is a public health problem: nearly 30 percent of adults in the United States report sleeping six or fewer hours per day, and rates are even higher among younger adults, racial and ethnic minorities, and patients with low socioeconomic status. In observational studies, short sleep duration has been associated with a variety of adverse health outcomes, including cardiovascular disease, obesity, and all-cause mortality.
- Sleep can be broadly segmented into rapid eye movement (REM) sleep and non-REM (NREM) sleep: Most adults will enter sleep from the drowsy state via NREM sleep. NREM sleep is divided into three sub-stages: stage N1, stage N2, and stage N3.
- REM sleep has typically been associated with vivid dreaming, based on early studies in which patients were awoken out of REM sleep. Although REM sleep accounts for less than a quarter of total sleep time (ranging from 18 to 23 percent), the function of this stage of sleep is still an area of debate.
- There is 20% more brain activity during REM sleep than when we are awake.

- Two proteins influence our sleep:

☒☒ Adenosine – a product of muscle use, it builds up throughout the day, and as it increases in quantity, you become sleepy. Therefore, doctors recommend exercise to improve sleep. Note: Caffeine blocks adenosine receptors in the brain, preventing adenosine's access to the brain while caffeine is present. That is why caffeine keeps you awake.

☒☒ Melatonin – part of our circadian rhythm (day/night awake/sleep cycle). It builds up because of sunlight exposure through the eye. That exposure can be restricted by cataracts, retinopathy, stroke, Alzheimer's, and more, resulting in sleep disruption.

- Wearing sunglasses in the late afternoon also restricts sunlight exposure at a critical time of day and can disrupt sleep.
- As we age, we go earlier to bed and wake up early morning (Advanced sleep phase disorders)
- Circadian Rhythm is responsible for regulation of our Body Function, Temperature, Hormones, Obesity, Diabetes, Mood.
- Light therapy has significant effects on reducing Agitation and Depression in Dementia patients.
- Many diseases can cause sleep disorders including Diabetes, Heart and Digestive system diseases.
- Sleep Apnea (OSA) is a breathing related disorder.
- Patients with OSA are at increased risk for adverse clinical outcomes ranging from decreased daytime alertness and quality of life to cardiovascular morbidities and mortality to increase the risk for hospitalization.
- Patients with OSA, mainly when it is moderate or severe and untreated, are at increased risk for a broad range of cardiovascular morbidities, including systemic hypertension, pulmonary arterial hypertension, coronary artery disease, cardiac
- Patients with OSA have an increased prevalence of insulin resistance and type 2 diabetes. While this association can be manifested through shared risk factors such as obesity.

- Intermittent nocturnal hypoxia due to OSA may contribute to the development and severity of nonalcoholic fatty liver disease (NAFLD), independent of shared risk factors such as obesity.
- Snoring and daytime sleepiness are common but nonspecific manifestations of OSA. Additional symptoms and signs include restless sleep, periods of silence terminated by loud snorts or breathing, nocturnal angina, poor concentration, and awakening with a sensation of choking, gasping, or smothering. Arrhythmias, heart failure, and stroke.

- Sleep hygiene — Sleep hygiene refers to actions that tend to improve and maintain good sleep:

☐☐ Sleep if necessary to feel rested (usually seven to eight hours for adults) and then get out of bed.

☐☐ Maintain a regular sleep schedule, particularly a regular wake-up time in the morning.

☐☐ Try not to force sleep.

☐☐ Avoid caffeinated beverages after lunch.

☐☐ Avoid alcohol near bedtime (e.g., late afternoon and evening).

☐☐ Avoid smoking or other nicotine intakes, particularly during the evening.

☐☐ Adjust the bedroom environment as needed to decrease stimuli (e.g., reduce ambient light, turn off the television or radio).

☐☐ Avoid prolonged use of light-emitting screens (laptops, tablets, smartphones, eBooks) before bedtime.

☐☐ Resolve concerns or worries before bedtime.

☐☐ Exercise regularly for at least 20 minutes, preferably more than four to five hours before night.

☐☐ Avoid daytime naps, especially if they are longer than 20 to 30 minutes or occur late in the day.

- Sleep Aids can interfere with the process of coding of short-term memory and increase the risk of cognitive impairments.

- Medications or classes of medications that are approved to treat insomnia include benzodiazepines, nonbenzodiazepine hypnotics, melatonin agonists.
- Although all of these agents or types are more effective than placebo at improving short-term sleep outcomes, the magnitude of the effect is variable.
- Most trials have been industry sponsored, raising concerns about publication bias; and confidence in the overall estimation of the risk-to-benefit ratio is low.
- The potential benefits of pharmacologic therapy on sleep quality and daytime function are balanced against the risk of side effects as well as physical and psychological addiction with long-term use.
- Older adults have an unusually high risk of adverse effects from hypnotic drugs, including excessive sedation, cognitive impairment, delirium, night wandering, agitation, postoperative confusion, balance problems, and impaired performance of daily activities.
- In a meta-analysis of 24 randomized trials (2417 patients) that evaluated the impact of pharmacotherapy in adults older than 60 years with insomnia, there was an improvement of sleep quality, total sleep time, and frequency of nighttime awakening. However, the magnitude of these benefits was relatively small compared with the two- to fivefold increase in adverse cognitive or psychomotor events. This suggests that additional caution is necessary when deciding whether pharmacotherapy is indicated for an older patient with insomnia (and/or Sedative hypnotics in older people with insomnia: meta-analysis of risks and benefits. Glass J, Lanctôt KL, Herrmann N, Sproule BA, Busto UE, BMJ. 2005;331(7526):1169. Epub 2005 Nov 11)
- Several observational studies have found an association between use or prescription of hypnotic drugs and all-cause mortality ranging from 1.1 to 4.5.
- Concurrent use of any sleeping medication and alcohol (or another central nervous system depressant) increases the risk of central nervous system depression and, therefore, is contraindicated.

- The most common adverse effects associated with the benzodiazepines and nonbenzodiazepines are residual daytime sedation, drowsiness, dizziness, lightheadedness, cognitive impairment, motor incoordination, and dependence. Besides, most hypnotics are respiratory suppressants that can worsen obstructive sleep apnea or hypoventilation.
- Long-term use may be habit-forming and rebound insomnia may occur when some short-acting medications are discontinued. Less common adverse effects include complex sleep-related behaviors (e.g., sleepwalking, driving, making telephone calls, eating, or having sex while not fully awake), anterograde amnesia, aggressive behavior, and severe allergic reaction.
- Physicians and Patients need to discuss the pros and cons of using any sleep aids in detail.
- To have a night of better sleep, we need to understand our lifestyle better.

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