



# **Do you catch all your zzzz's? – The importance of Sleep**

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# Disclosure

I have no actual or potential conflict of interest in relation to any product or service mentioned in this program or presentation.



# Agenda

1. Review the pathophysiology of Sleep
2. Review the importance of sleep
3. Explain how sleep affects chronic conditions
4. Review ways to ensure proper sleep
5. Review how to detect the signs of poor sleep





**What is sleep?**

# Brain Basics: Understanding Sleep

- We spend about one-third of your time sleeping
- Quality sleep – and getting enough of it at the right times -- is as essential to survival as food and water.
- Without sleep you can't form or maintain the pathways in your brain that let you learn and create new memories, and it's harder to concentrate and respond quickly.
- Sleep is far from a passive state; it is a vital process for brain restoration and regulation.
- Sleep affects almost every type of tissue and system in the body – from the brain, heart, and lungs to metabolism, immune function, mood, and disease resistance.
- Research shows that a chronic lack of sleep, or getting poor quality sleep, increases the risk of disorders including high blood pressure, cardiovascular disease, diabetes, depression, and obesity.
- According to the Centers for Disease Control and Prevention, about 1 in 3 adults in the United States reported not getting enough rest or sleep every day.
- Nearly 40% of adults report falling asleep during the day without meaning to at least once a month. Also, an estimated 50 to 70 million Americans have chronic, or ongoing, sleep disorders.
- Sleep deficiency can lead to physical and mental health problems, injuries, loss of productivity, and even a greater likelihood of death



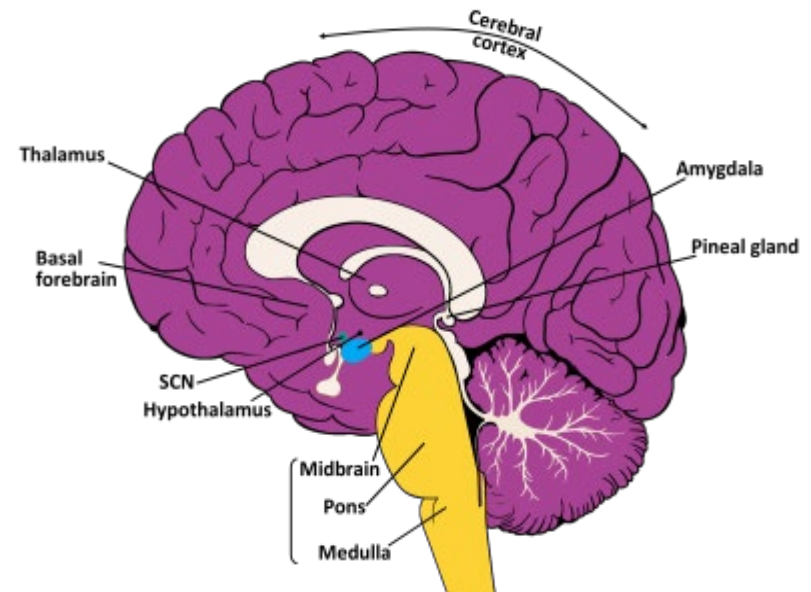
# So what's all the hype about sleep??

- **Sleep is a pillar of health** - It is vital to recognize sleep as a fundamental pillar of public health.
- **Impacts health disparities** - Growing research indicates that racial and ethnic minority groups are disproportionately affected by sleep and circadian disparities, which exacerbate chronic disease disparities
- **Environmental influences**:- today's 24-hour lifestyle, coupled with the pervasive use of electronics and social media, has normalized inadequate sleep among many children and adolescents, with uncertain effects on brain development, mental health, and vascular health
- **Mental health in youth** - Insufficient sleep among adolescents is associated with poor mental health, including depressive symptoms, feelings of sadness or hopelessness and suicidal thoughts and plans.
- **Parental responsibility** - parents and caregivers play a crucial role in promoting healthy sleep behaviors in children. Underscore the importance of addressing sleep as a modifiable risk factor in adolescent mental health and incorporating it into suicide prevention efforts



# Anatomy of Sleep - Several structures within the brain are involved with sleep.

- **The hypothalamus**- deep inside the brain, contains groups of nerve cells that act as control centers affecting sleep and arousal.
- **suprachiasmatic nucleus (SCN)** - clusters of thousands of cells that receive information about light exposure directly from the eyes and control your behavioral rhythm.
- **The brain stem** (pons, medulla, midbrain)- at the base of the brain, communicates with the hypothalamus to control the transitions between wake and sleep. Pons and medulla primarily also play a special role in REM sleep by sending signals to relax muscles essential for body posture and limb movements, so that we don't act out our dreams
- **The thalamus** - relay for information from the senses to the cerebral cortex. During most stages of sleep, the thalamus becomes quiet, letting you tune out the external world. But during REM sleep, the thalamus is active, sending the cortex images, sounds, and other sensations that fill our dreams
- **The pineal gland**, - receives signals from the SCN and increases production of the hormone *melatonin*, which helps put you to sleep once the lights go down. \*
- **The basal forebrain** - promotes sleep and wakefulness. Release of adenosine supports your sleep drive.\*
- Part of **the midbrain** acts as an arousal system.
- **The amygdala**- involved in processing emotions, becomes increasingly active during REM sleep.



# Stages of Sleep

- There are two basic types of sleep:
  - rapid eye movement (REM) sleep
  - non-REM sleep
    - (which has three different stages).
    - Each is linked to specific brain waves and neuronal activity.

You cycle through all stages of non-REM and REM sleep several times during a typical night, with increasingly longer, deeper REM periods occurring toward morning





1

**the changeover from wakefulness to sleep.**

During this short period (lasting several minutes) of relatively light sleep, your heartbeat, breathing, and eye movements slow, and your muscles relax with occasional twitches. Your brain waves begin to slow from their daytime wakefulness patterns.

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2

**period of light sleep before you enter deeper sleep; You spend more of your repeated sleep cycles in stage 2 sleep than in other sleep stages.**

Your body temperature drops and eye movements stop. Brain wave activity slows but is marked by brief bursts of electrical activity. Your heartbeat and breathing slow, and muscles relax even further

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3

**period of deep sleep that you need to feel refreshed in the morning, occurs in longer periods during the first half of the night.**

Your heartbeat and breathing slow to their lowest levels during sleep. Your muscles are relaxed and it may be difficult to awaken you. Brain waves become even slower

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REM

**first occurs about 90 minutes after falling asleep, As you age, you sleep less of your time in REM sleep.**

Your breathing becomes faster and irregular, and your heart rate and blood pressure increase to near waking levels. Most of your dreaming occurs during REM sleep, Your arm and leg muscles become temporarily paralyzed, which prevents you from acting out your dreams.

**Memory consolidation most likely requires both non-REM and REM sleep.**



# Sleep Mechanisms

- Two internal biological mechanisms—circadian rhythm and homeostasis—work together to regulate when you are awake and sleep.
- **Sleep-wake homeostasis** keeps track of your need for sleep.
  - reminds the body to sleep after a certain time
  - regulates sleep intensity.
    - This sleep drive gets stronger every hour you are awake and causes you to sleep longer and more deeply after a period of sleep deprivation.

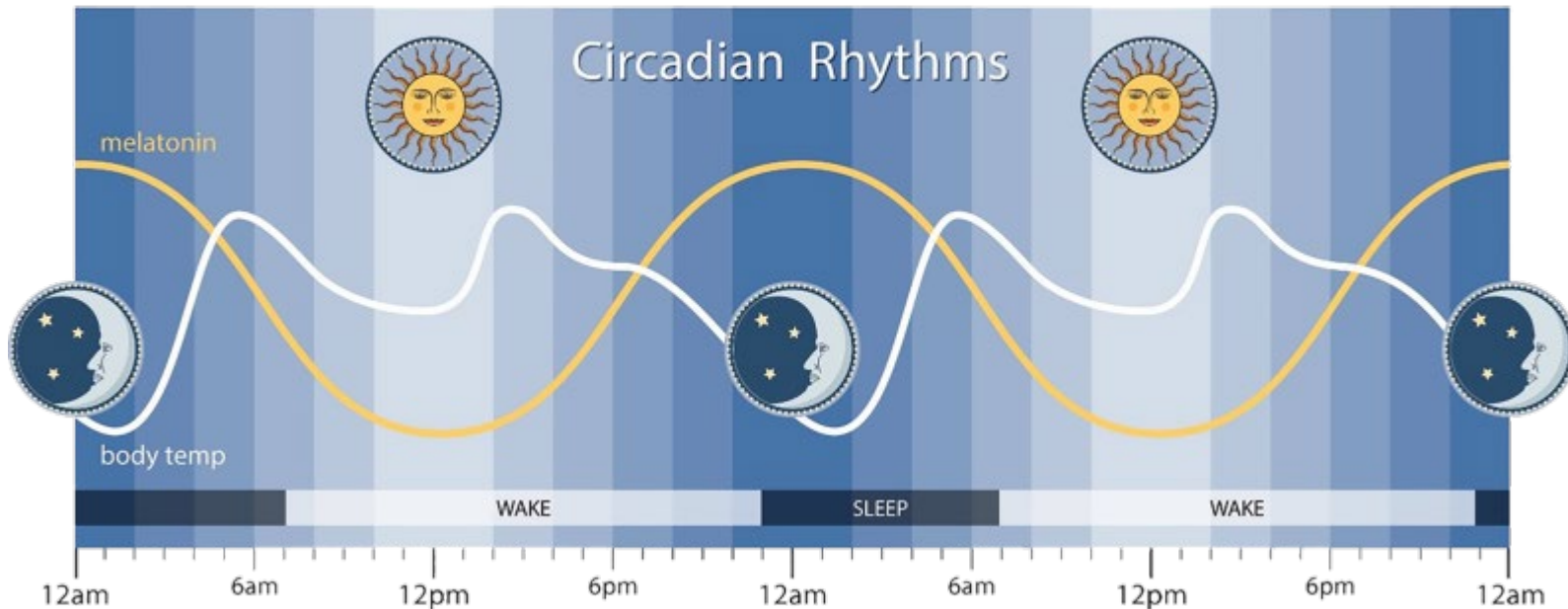


# Understand some basics of sleep - your Biological clock & Circadian Rhythms

- **Biological clocks** are organisms' natural timing devices, based on a roughly 24-hour day,
  - Regulates and controls the cycle of circadian rhythms.
  - composed of specific molecules (proteins) that interact with cells throughout the body. Nearly every tissue and organ contains biological clocks.
  - Researchers have identified similar genes in people, fruit flies, mice, plants, fungi, and several other organisms that make the clocks' molecular components
- **Circadian rhythms** are physical, mental, and behavioral changes that follow a 24-hour cycle. direct a wide variety of functions from daily fluctuations in wakefulness to body temperature, metabolism, and the release of hormones.
  - These natural processes respond primarily to light and dark
  - They control your timing of sleep and cause you to be sleepy at night and your tendency to wake in the morning without an alarm.
  - Circadian rhythms synchronize with environmental cues (light, temperature) about the actual time of day, but they continue even in the absence of cues.



# Circadian Rhythms



- Your body's biological clock is based on a 24-hour day and controls most circadian rhythms. These rhythms affect a variety of functions including body temperature (represented as the white line on the chart above). Melatonin - a hormone released by the pineal gland - helps you feel sleepy once the lights go down. The peaks and valleys of melatonin (represented as the gold line above) are important for matching the body's circadian rhythm to the external cycle of light and darkness.



# The body makes & keeps its own circadian rhythms

- natural factors in your body produce circadian rhythms.
- For humans, some of the most important genes in this process are the Period and Cryptochrome genes
- These genes code for proteins that build up in the cell's nucleus at night and lessen during the day
- These proteins help activate feelings of wakefulness, alertness, and sleepiness according to fruit fly studies.
- Signals from the environment also affect circadian rhythms. Eg. exposure to light at a different time of day can reset when the body turns on Period and Cryptochrome genes.



# Understand some basics of sleep

- Circadian rhythms can influence important functions in our bodies, such as:
  - ❖ Hormone release
  - ❖ Eating habits and digestion
  - ❖ Body temperature

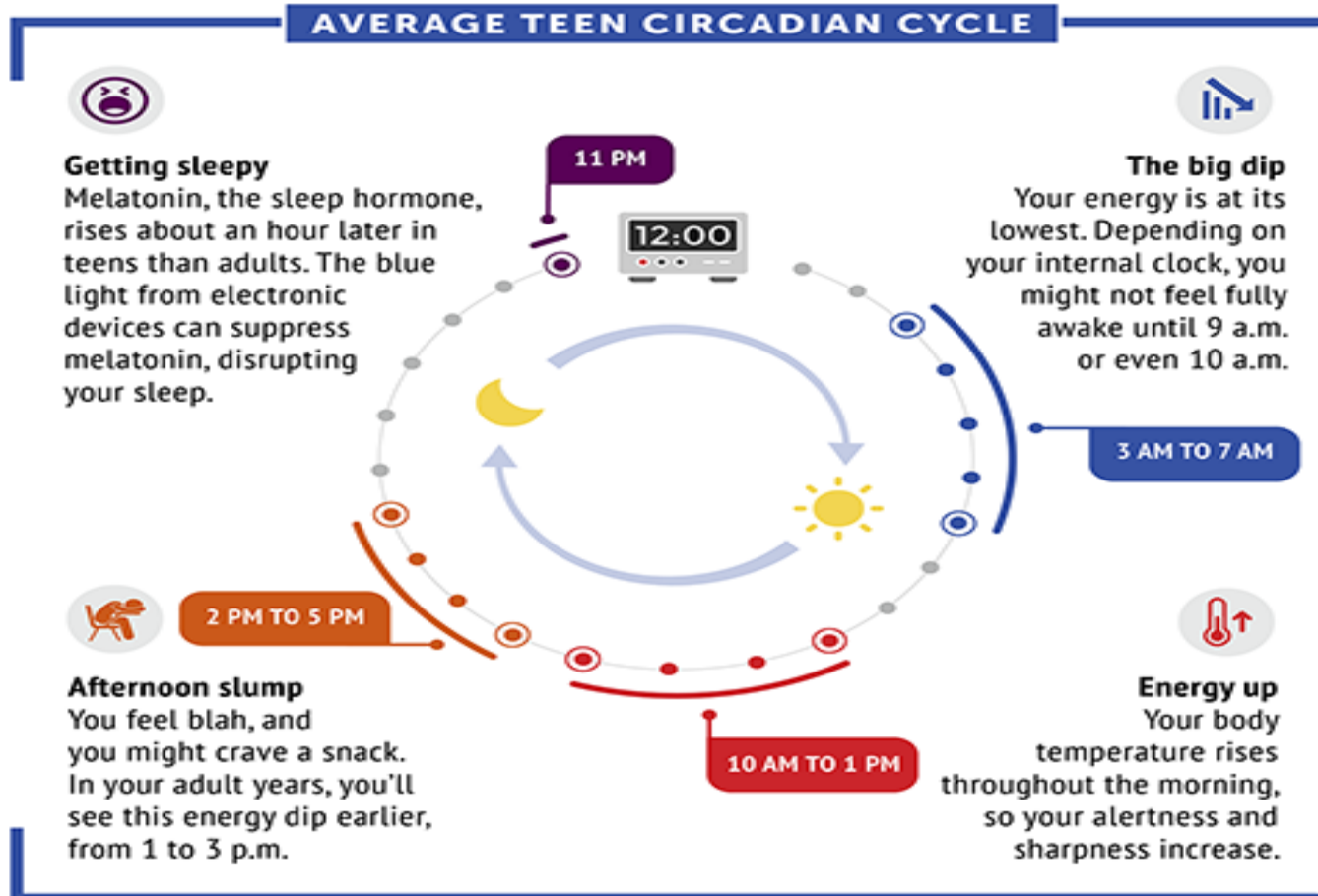
Changes in our body and environmental factors can cause our circadian rhythms and the natural light-dark cycle to be out of sync. Eg.

- ❖ Mutations or changes in certain genes can affect our biological clocks.
- ❖ Jet lag or shift work causes changes in the light-dark cycle.
- ❖ Light from electronic devices at night can confuse our biological clocks.

*These changes can cause sleep disorders, and may lead to other chronic health conditions, such as obesity, diabetes, depression, bipolar disorder, and seasonal affective disorder.*



# Circadian rhythm cycle of a typical teenager. Credit: NIGMS.



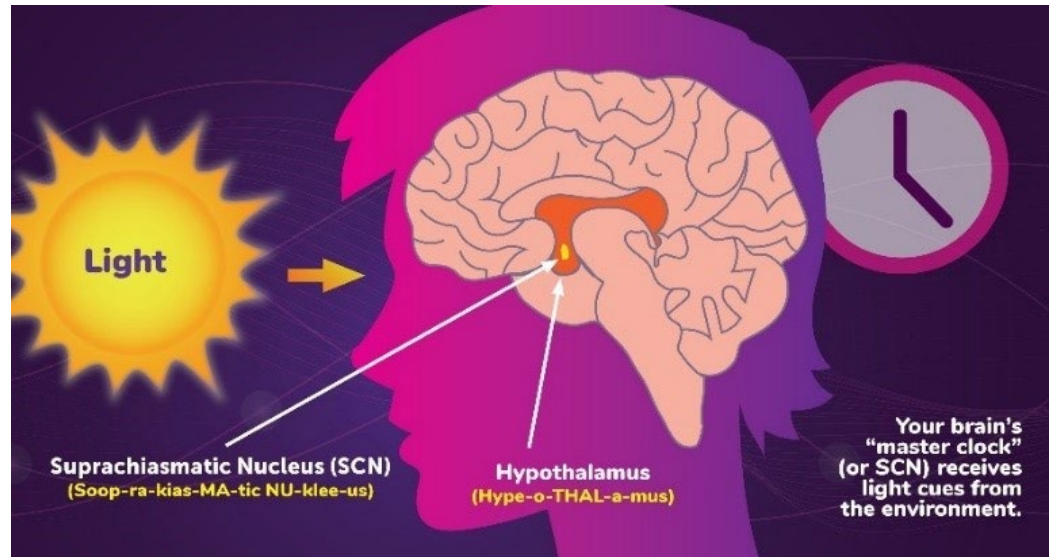
# Understand some basics of sleep - the Master clock

The regulation of sleep is processed by the homeostatic physiology of the circadian rhythm, the sleep/wake cycle. Circadian rhythm is the 24-hour internal clock in our brain that regulates cycles of alertness and sleepiness by responding to light changes in our environment.

**Circadian Rhythm:** There are 4

- Diurnal (night and day)
- Circadian (24 hours)
- Ultradian (less than 24 hours)
- Infradian/Circalunar (1 month)

The circadian rhythms are controlled in the **hypothalamus** which houses the SCN- the master clock is a group of about 20,000 nerve cells (neurons) that form a structure called the suprachiasmatic nucleus, or SCN. the hypothalamus receives direct input from the eyes. The SCN controls the production of **melatonin**, a hormone that makes you sleepy.



The SCN receives information about incoming light from the optic nerves, which relay information from the eyes to the brain. When there is less light—for example, at night—the SCN tells the brain to make more melatonin so you get drowsy.







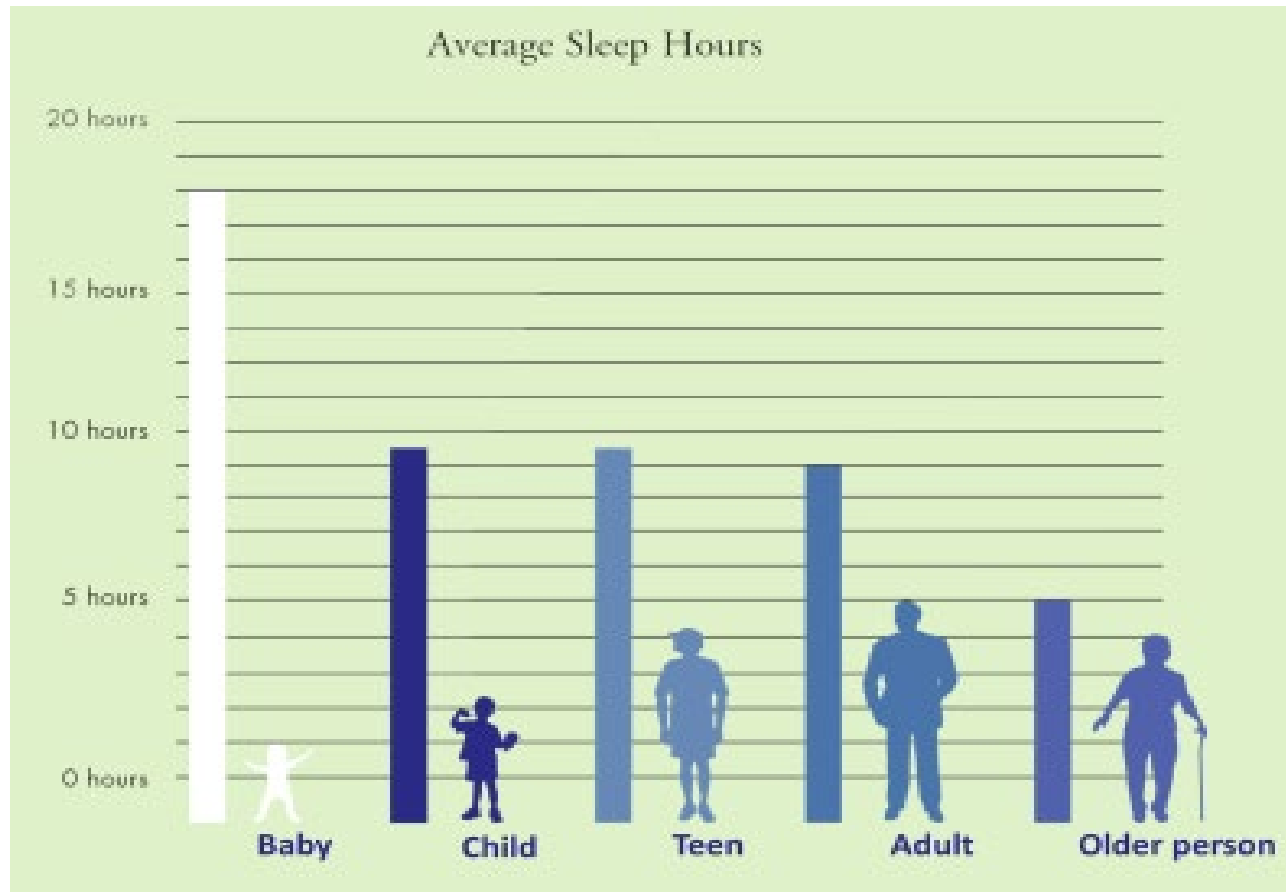
**Why is sleep important?**

# Sleep is a pillar of health

- It is vital to recognize sleep as a fundamental pillar of public health.
- Sleep health has multifactorial influences, bidirectional relationships with health outcomes, and individual variations
- Divided into focus on sleep duration, sleep disturbances and sleep timing or schedules
  - Sleep timing - pertains to when one initiates sleep, typically referenced to societal norms and personal obligations.
  - Sleep regularity - refer to the consistency of one's sleep and wake times across days, including both weekdays and weekends.



# How Much Sleep Do You Need?



Sleep needs change with age as shown on the chart above. Initially, babies sleep 16-18 hours a day. School-age children and teens need about 9.5 hours of sleep each night. Most adults require 7-9 hours of sleep at night. However, older adults (age 60 and above) tend to sleep for shorter periods at night.



# Why is sleep important?

- optimal sleep (defined as 7 to 9 hours per night).
- An increasing number of researchers and clinicians are becoming more interested in this as a foundational pillar of health, alongside activity and diet,
- Efforts are underway to expand our understanding of sleep beyond sleep duration and disturbances to gain insights into how sleep affects overall health.
- The National Health and Nutrition Examination Survey (NHANES) recently incorporated questions about weekday and weekend sleep schedules





# **Sleep Disorders & impact on chronic diseases.**

# Sleep disorders

- **Circadian Rhythm Sleep-Wake Disorders (CRSWD) - Delayed sleep-wake phase syndrome, or **delayed sleep-wake phase disorder (DSPD)**- most common,** problems with the sleep-wake cycle. They make you unable to sleep and wake at the right times.
  - which feature a shift in the timing of sleep onset and offset (mainly assessed by using data on weekend sleep), provide crucial insight into sleep timing.
  - characterized by sleep and wake times that are substantially delayed relative to societal norms, leading to distress or impairment in social, occupational, or other important areas of functioning
  - often observed among adolescents and young adults, is characterized by a preference for sleep and wake times that are misaligned with societal demands
  - often experience comorbid depression, among other conditions.
  - **Intrinsic CRSWD**
  - **Extrinsic CRSWD** :- environmentally influenced CRSWDs (i.e., shift work disorder and jet lag disorder)



# Sleep Disorders

**Central disorder of Hypersomnolence** - being unable to stay awake during the day. This includes narcolepsy, which causes extreme daytime sleepiness.

- Adults with Narcolepsy
- Pediatric patients with Narcolepsy
- Adult patients with idiopathic Hypersomnia
- Adult patients with Kleine-Levin Syndrome
- Adult patients with Hypersomnia due to Medical conditions
- Hypersomnia secondary to Alpha-synucleinopathies (Lewy body dementia, Parkinson's ds)
- Post traumatic Hypersomnia
- Adult patients with genetic disorders associated with primary CNS somnolence
- Adult patients with hypersomnia secondary to brain tumors, infections or other CNS system lesions

**Insomnia** - being unable to fall asleep and stay asleep. This is the most common sleep disorder.



# Sleep disorders

**Parasomnias (REM sleep behavior disorder) rapid eye movement sleep behavior disorder (RBD)** – acting in unusual ways while falling asleep, sleeping, or waking from sleep, such as walking, talking, or eating

Adults with isolated RBD

Adults with secondary RBD due to a medical conditions

Adults with drug-induced RBD

Sexsomnia (NREM) - characterized by sexual behavior during sleep; a variant of confusional arousals and sleepwalking, with or without associated obstructive sleep apnea

**Sleep related breathing Disorders** –a breathing disorder in which you stop breathing for 10 seconds or more during sleep

Obstructive Sleep Apnea

Central Sleep Apnea

**Sleep related Movement Disorders** –a tingling or prickly sensation in your legs, along with a powerful urge to move them

Restless leg syndrome & Periodic Movement disorder in Adults





# How poor sleep impacts chronic diseases

- **Chronic pain** - problems create a "kind of vicious circle", Pain disrupts sleep. Insufficient sleep worsens pain. Although inflammation may play a part, investigators are still trying to clarify the mechanisms that connect them and the best ways to intervene to improve patient outcomes.
- **Depression** - sleep disorders overall are common in patients with depression and/or anxiety
- **DM2, Poor glucose control** - sleep duration, efficiency, and midpoint are important determinants of postprandial glycemic control. There is a strong link between glucose regulation and the quality and duration of sleep. Sleep is a key pillar of health, and focusing on both sleep and diet is key for healthy blood glucose control,
- **Heart disease** – Insomnia — difficulty falling or staying asleep — was associated with a 69% greater risk of having a myocardial infarction (MI) than among adults without insomnia, according to new Egyptian research. Those who slept 5 or fewer hours per night had the highest risk for MI, and those with both diabetes and insomnia had double the risk for MI compared with patients without these comorbidities.
- **Obesity** -





# Signs & symptoms of poor sleep

# Signs & symptoms of poor sleep or sleep disorder

- If a patient has had pain for 6 months and treatments are not working, the chance that they have a treatable sleep disorder "is very high, above 50%,"
- You regularly take more than 30 minutes each night to fall asleep
- You regularly wake up several times each night and then have trouble falling back to sleep, or you wake up too early in the morning
- You often feel sleepy during the day, take frequent naps, or fall asleep at the wrong times during the day
- Your bed partner says that when you sleep, you snore loudly, snort, gasp, make choking sounds, or stop breathing for short periods
- You have creeping, tingling, or crawling feelings in your legs or arms that are relieved by moving or massaging them, especially in the evening and when trying to fall asleep
- Your bed partner notices that your legs or arms jerk often during sleep
- You have vivid, dreamlike experiences while falling asleep or dozing
- You have episodes of sudden muscle weakness when you are angry or fearful, or when you laugh
- You feel as though you cannot move when you first wake up



# Signs & symptoms of poor sleep or sleep disorder

- interfere with work, school, driving, and social functioning.
- trouble learning, focusing, and reacting.
- hard to judge other people's emotions and reactions.
- can make you feel frustrated, cranky, or worried in social situations.
- higher chance of injury in adults, teens, and children.
  - eg sleepiness while driving (not related to alcohol) is responsible for serious car crash injuries and death. Eg. played a role in human mistakes linked to tragic accidents, such as nuclear reactor meltdowns, grounding of large ships, and plane crashes.
- In older adults, sleep deficiency may be linked to a higher chance of falls and broken bones.
- Children who are sleep deficient might be overly active and have problems paying attention. They also might misbehave, and their school performance can suffer
- Sleep deficiency is linked to many chronic health problems, including heart disease, kidney disease, high blood pressure, diabetes, stroke, obesity, and depression.
- ***A common myth is that people can learn to get by on little sleep with no negative effects. However, research shows that getting enough quality sleep at the right times is vital for mental health, physical health, quality of life, and safety.***





# How to evaluate?

# Evaluation and testing

- Know that when patients present with mood issues or complaints, we need to ask about sleep; and in the same sense when they present with sleep complaints we need to ask about mood
- Insomnia & OSA should **be screened for** with a thorough history and physical , and patients should be educated about the importance of sleep
- refer patients to a **sleep specialist** as indicated ( usually would be a Pulmonologist or Neurologist)
- Home sleep apnea test
- **a sleep study (polysomnogram)**. The most common types of sleep studies monitor and record data about your body during a full night of sleep. The data includes:
  - Brain wave changes
  - Eye movements
  - Breathing rate
  - Blood pressure
  - Heart rate and electrical activity of the heart and other muscles
- **Other types of sleep studies** may check how quickly you fall asleep during daytime naps or whether you are able to stay awake and alert during the day
  - Actigraphy – 24hr device to measure your movements
  - Maintenance of Wakefulness test (MWT) – measures how alert you are during the day
  - Multiple Sleep Latency test ( MSLT) – checks for excessive daytime sleepiness by measuring how quickly you fall asleep

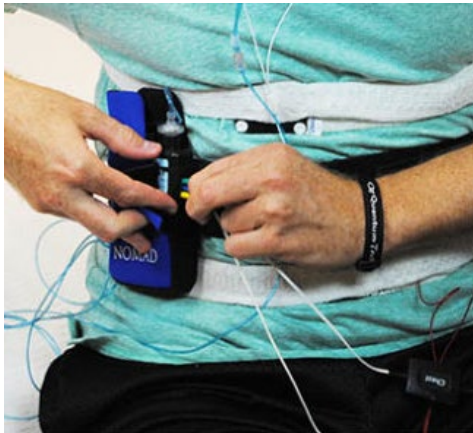




# Sleep studies and Tests

(clockwise from top left)

- A. - Actigraphy
- B - Maintenance of Wakefulness test
- C - Home Sleep Apnea test
- D – Sleep study
- E - Multiple Sleep Latency test





# **Treatment & improving Sleep habits**



# Treatment – Tips for Getting a Good Night's Sleep

- Set a schedule – go to bed and wake up at the same time each day.
- Exercise 20 to 30 minutes a day but no later than a few (5-6 hr) hours before going to bed.
- Avoid caffeine and nicotine late in the day and alcoholic drinks before bed.
- Relax before bed – try a warm bath, reading, or another relaxing routine.
- Create a room for sleep – avoid bright lights and loud sounds, keep the room at a comfortable temperature, and don't watch TV or have a computer in your bedroom.
- Don't lie in bed awake. If you can't get to sleep, do something else, like reading or listening to music, until you feel tired.
- See a doctor if you have a problem sleeping or if you feel unusually tired during the day. Most sleep disorders can be treated effectively.



# Treatment

- **Education** - one-size-fits-all sleep recommendations are suboptimal, particularly in the context of postprandial glycemic control,
- **Timed physical activity/Exercise** -
- **Strategic avoidance of light** -
- **Bright light therapy** – in the morning
- **Cognitive Behavior Therapy for insomnia (CBT-I)** - A structured intervention such as CBT-I is likely more beneficial than education about sleep hygiene alone in resolving sleep disturbances.
  - It is recommended by the American Academy of Sleep Medicine **as the first-line treatment for chronic insomnia.**
  - CBT-I includes active components such as sleep restriction therapy and stimulus control therapy
  - or relaxation techniques to reduce anxiety about getting enough sleep
- **Continuous positive airway pressure (CPAP) & oral devices \*\* & procedures** for OSA
- **Aligning sleep schedules** with societal obligations requires management strategies tailored to each person's needs and circumstances
- **Policy changes such as later school start times** could be an effective public health intervention (American Academy of Pediatrics)
- **Sleep promoting medications** -
- **Wakefulness promoting medications** -
- **Timed oral administration of melatonin or agonists** -These products may help some people but are generally for short-term use.



# Treatments – Therapies

- **Light therapy**

- Light therapy involves sitting in front of a light box, which produces bright light similar to sunlight. Light visors and light glasses may also be effective. Light therapy may help adjust the amount of melatonin your body needs to make to reset your sleep-wake cycle.
- Side effects of light therapy may include agitation, eye strain, headaches, migraines, and nausea.

- **Orofacial therapy**

- Exercises for your mouth and facial muscles, also called orofacial therapy, may help treat sleep apnea in children and adults. This therapy helps improve the position of the tongue and strengthens the muscles that control lips, tongue, upper airway, and face.



# Treatments- Cognitive behavioral therapy for insomnia

## • Cognitive behavioral therapy for insomnia (CBT-I)

- CBT-I is a 6- to 8-week treatment plan t
- instruct on how to fall asleep faster and stay asleep longer.
- usually recommended as the **first treatment option** for long-term insomnia and can be very effective.
- CBT-I can be done by a healthcare provider, nurse, or therapist; it can be done in person, by telephone, or online. It involves the following parts:
  - Cognitive therapy reduces nervousness about not being able to sleep.
  - Relaxation or meditation therapy teaches how to relax and fall asleep faster.
  - Sleep education teaches good sleep habits.
  - Sleep restriction therapy restricts the amount of time to spend in bed, even if you are not able to sleep during this time. With time, this improves sleep quality in bed. Sleep time can be increased when sleep quality is better.
  - Stimulus control therapy helps encourages a regular sleep-wake cycle to link being in bed with being asleep. This involves going to bed only when sleepy, getting out of bed if unable to sleep, and using the bed only for sleep and sexual activity.



# Treatment – Medicines

## • Medicines to help you fall asleep

- **Benzodiazepine receptor agonists** are medicines such as zolpidem (Ambien), zaleplon (Sonata), and eszopiclone (Lunesta) .
  - Side effects may include anxiety. Rare side effects may include having a severe allergic reaction or doing activities while asleep such as walking, eating, or driving.
- **Melatonin receptor agonists** are medicines such as ramelteon (Rozerem).
  - Side effects can include dizziness and fatigue. Some people experience the rare side effects of doing activities while they are asleep, like walking, eating, or driving; or they may have a severe allergic reaction.
- **Orexin receptor antagonists** such as suvorexant (Belsomra) are not recommended for people who have narcolepsy.-
  - Rare side effects may include doing activities while asleep such as walking, eating, or driving; or not being able to move or speak for several minutes while going to sleep or waking up.
- **Benzodiazepines** (Xanax, klonopin) may be prescribed for insomnia *if other treatments and medicines have not worked*.
  - Side effects of these medicines, which can include dizziness, confusion, and muscle weakness. Benzodiazepines can also interact dangerously with other medicines. They can be habit-forming and should be taken for only a few weeks.
- **OFF-LABEL MEDICINES** - In some cases, healthcare providers may prescribe medicines that are commonly used for other health conditions but are not approved by the U.S. Food and Drug Administration (FDA) to treat insomnia. Some of these medicines include antidepressants, antipsychotics, and anticonvulsants



# Treatment -OVER-THE-COUNTER MEDICINES AND SUPPLEMENTS

- **OTC products that contain antihistamines** - are sold as sleep aids & can cause sleepiness. Antihistamines can be unsafe for some people
- **Melatonin supplements** - are lab-made versions of the sleep hormone melatonin. **These supplements are not regulated by the U.S. Food and Drug Administration like medicines. Because of this, the dose and purity of these supplements can vary between brands.**
  - Side effects of melatonin may include excess sleepiness, headaches, high blood pressure, low blood pressure, stomach upsets, and worsening symptoms of depression. Caution is pregnant or plan to become pregnant.
- **Dietary supplements** - may help you sleep, but they can also have health risks.
- **Foods** – *some can promote sleep or make you sleepy. As there are a range of varieties of cultivars of most foods, this means that the nutrient profile can be inconsistent. (eg. Some red grapes have high levels of melatonin and others have none!)*
  - Kiwi - ?unknown how ? Due to antioxidants
  - Tart cherries – have high levels of melatonin, also antioxidants
  - Malted Milk (Horlicks) – reduces sleep interruptions, uncertain explanation but milk contains melatonin
  - Fatty fish (eg salmon) - ?explanation, possible due to high Vit D & Omega 3 (involved in regulation of body's serotonin)
  - Nuts (eg. almonds, walnuts, cashews, pistachios) – contain melatonin and Mg, Zn all combined helps sleep
  - Rice – CHO/high glycemic index intake mixed results in studies:\*\*\*
  - (others: CBD oil, Kava, California poppy, Glycine, Valerian, Chamomile, 5-HTP, Passionflower, Mg, magnolia bark, Lavender)\*\*\*



# Treatment – medicines to help you stay awake

- Some people with sleep conditions, like narcolepsy, need to take medicine to help them stay awake during the day. Sometimes, people can use caffeine to help promote wakefulness, but other times, prescription medicine is required.
- **Stimulants, or wakefulness-promoting agents**, Modafinil (Provigil), (methylphenidate- Ritalin, Concerta etc), Amphetamines (Adderall, Dexedrine etc), newer: Solriamfetol(Sunosil), Pitolisant (Wakix), off label- lisdexamfetamine dimesylate (Vyvance), Armodafinil (Nuvigil)
  - can help with daytime alertness.
  - The effects of these medicines may last only for a short time,
  - Side effects: may still experience some sleepiness, can be habit forming
- **Depressants**, such as sodium oxybate (Xyrem), Pitolisant(Wakix)
  - treat daytime sleepiness and cataplexy which is the sudden loss of voluntary muscle control.
  - Side effects can include bedwetting, headache, and dizziness.



# Summary – Sleep as a pillar of health

- It is vital to recognize sleep as a fundamental pillar of public health.
- By prioritizing sleep, addressing sleep disturbances and disorders, and promoting comprehensive approaches that encompass mental health and chronic disease prevention, public health initiatives can enhance the well-being of individuals and communities, as well as ameliorate health disparities among racial and ethnic minority groups.
- And by understanding the complex interplay between sleep, mental health, and chronic diseases, public health efforts can promote sleep health and improve overall well-being.
- Multisector efforts among individuals and groups are important for advancing research, implementing effective interventions, and addressing health disparities. Sleep health has multifactorial influences, bidirectional relationships with health outcomes, and individual variations, necessitating comprehensive, concrete solutions.
- Collaborative efforts to get a deeper understanding of the complex interplay among sleep, mental health, and cognitive functioning across the life span, contributing to improved public health outcomes





# Call to Action

- Be alert and aware of the symptoms and signs
- Know how to counsel and communicate the importance of addressing the signs
- Understand that inadequate attention to sleep deprivation can impact the chronic diseases we are trying to control
- Be aware of methods to test and know when to recommend
- Understand the different treatment options and be able to advise and provide counsel as to available options
- Understand that addressing sleep deprivation is a collaborative multisectoral condition

**Thus, better sleep may be key to reducing the burden of chronic diseases.**

**This is a simple but effective intervention**



# Sleep trials

- Researchers around the United States are conducting dozens of studies related to sleep and pain. The following trials [are recruiting](#) participants, according to ClinicalTrials.gov:
- [Sleep and Pain Interventions in Women With Fibromyalgia \(SPIN-II\)](#) . Investigators at the University of Missouri–Columbia are examining two cognitive-behavioral treatments for women with fibromyalgia and insomnia. "This trial will yield important information about the roles of sleep, arousal, and brain structure and function in the development and maintenance of chronic pain in women with fibromyalgia," the researchers say.
- [Prospective Randomized Trial of CPAP for SDB in Patients Who Use Opioids \(PRESTO\)](#) . At the University of California, San Diego, researchers are investigating whether patients with chronic pain who use opioids and have sleep-disordered breathing may benefit from treatment with continuous positive airway pressure (CPAP). They plan to assess the intervention's effects on sleep quality, pain, and quality of life. They also will see which patients are least likely to benefit from this treatment approach.
- [Latent Aging Mechanisms in Pain and Sleep \(LAMPS\)](#) . Researchers at the University of Florida are studying the effects of oral gamma-aminobutyric acid in older adults with chronic pain and sleep difficulties.
- [Sleep and Pain in Sickle Cell Disease](#) . At Johns Hopkins University, investigators are evaluating how behavioral sleep interventions influence pain and brain function in patients with [sickle cell disease](#).
- [Pain in Long COVID-19: The Role of Sleep](#) . Researchers at Beth Israel Deaconess Medical Center are conducting an observational study of patients with long COVID who have pain and sleep disturbances. The study aims "to understand the role of sleep in the development and persistence of pain symptoms in long COVID," they say.
- [Intervention for Sleep and Pain in Youth: A Randomized Controlled Trial \(I-SPY-RCT\)](#) . Adolescents with [migraine](#) are being recruited by a team at Seattle Children's Hospital for a randomized controlled trial. The study will examine the effects of CBT-I as well as the combined effect of CBT-I and pain interventions on reducing insomnia symptoms and headache-related disability in this population.





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**Any  
questions**



Thank you



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