Sleeping Disorders

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Sleep

- **Sleep**: state where an individual lacks conscious awareness of environmental surroundings, but can easily be aroused
- Adults need about 7 hours of sleep a day
- **Sleep disorders & sleep disturbances**: conditions that result in poor quality of sleep
- Many sleep disorders go untreated due to the lack of communication about sleep between healthcare providers and patients
Sleep Disorders

- As mentioned before, sleep disorders are conditions that result in poor quality of sleep
- 70 different types of classified sleep disorders
  - Dyssomnias: insomnia, hospital-acquired sleep disorders, narcolepsy, circadian rhythm disorders, sleep-disordered breathing & periodic limb movement disorder
  - Parasomnias: sleep walking, sleep terrors & nightmares
- Sleep loss and poor quality of sleep affect and change the way the body functions
- They can decrease cognitive function, cause depression, impair daytime functioning, cause social isolation & can reduce ones overall quality of life
Sleep Disorders

The following video explains different types of sleep disorders!

https://www.youtube.com/watch?v=X2yfUL8uct0
Physiological Sleep Mechanisms

- **Sleep-wake cycle**: NS controls changes between being awake and sleeping
  - **Wake behaviour**: activated cortical brain-wave pattern (EEG), the reticular system known as (RAS) activates the EEG and arouses behaviour. Various neurotransmitters are involved
  - **Sleep behaviour**: regulated by several neurological structures. Sleep promoting neurotransmitters, delta-sleep-inducing peptide prostaglandins & proinflammatory cytokines.

- **Orexin**: a neuropeptide found in the lateral hypothalamus that influences wake behaviour by activating RAS

- **Melatonin**: An endogenous hormone made by the pineal gland and decreases sleep latency, but increases sleep efficiency in the CNS

- **Circadian Rhythms**: like a 24hr internal clock in your brain that cycles patterns of sleepiness and alertness at regular intervals, AKA the sleep-wake cycle
Physiological Sleep Mechanisms

❖ **Sleep Architecture**: once a person is asleep they go through sleep cycles which typically last 90 mins and are repeated throughout the entire sleep time. Sleep can be divided into two major states:

➢ **NREM sleep**: (non-rapid eye movement)- 75%-80% of sleep is NREM for a healthy individual. NREM can be split into 3 stages.
   - Stage 1 is at the beginning when one closes their eyes and transitions from wakefulness to sleep (1-7 mins)
   - Stage 2 is when one is sound asleep, and their heart rate slows down and body temperature decreases (10-25 mins)
   - Stage 3 is deep sleep because the individual is in the deepest stage of sleep (20-40 mins)

➢ **REM sleep**: (rapid eye movement)- is about 20-25% of sleep that happens about 4-5 times during a 7-8hr period of sleep and follows after NREM sleep. It is when vivid dreaming occurs.
Sleep Cycle:

1. Interim between consciousness and sleep
   - Move to Stage 2 after 5-15 mins
   - Heart rate slows, brain does less complicated tasks

2. Delta stage
   - After another 15 mins, move into non-REM sleep, the Delta stage

3. Body makes repairs

4. Body temperature & BP decreases
   - Move into REM sleep approx. 90 mins after feeling sleepy

5. REM
   - Increase in eye movement, heart rate, breathing, BP & temperature
Insomnia

❖ Most common sleep disorder
❖ It is the difficulty to fall asleep, stay asleep, as well as, waking up too early and having a poor quality of sleep
❖ **Acute Insomnia**: difficulties falling asleep or staying asleep for a minimum of 3 nights/week over 2 weeks
❖ **Chronic Insomnia**: difficulties falling asleep or staying asleep for a minimum of 3 nights/week over 2 weeks **AND** a day time complaint such as fatigue, lack of concentration, for a month or more
  ➢ Primary or Idiopathic insomnia: lifelong difficulty with falling asleep and staying asleep= poor daytime functioning
  ➢ Secondary (co-morbid) insomnia: caused by a psychiatric illness, medical conditions, medications or substance abuse
❖ **Inadequate Sleep Hygiene**: practices/behaviours that are inconsistent with an individual’s quality of sleep such as stimulant consumption (ie: caffeine), medication side effects, alcohol to help induce sleep, smoking near bedtime, taking long midday naps or sleeping in until late
Insomnia

Clinical Manifestations of Insomnia:

1. Difficulty falling asleep (long sleep latency)
2. Frequent awakenings (fragmented sleep)
3. Prolonged nighttime awakenings or awakening too early & not being able to fall back asleep
4. Feeling unrefreshed on awakening (nonrestorative sleep)

❖ CBT for management of insomnia, drug therapies (benzodiazepines, antidepressants & antihistamines) & complementary/alternative therapies (Valerian, acupuncture) are used to treat and help individuals with insomnia
Sleep Disturbances in the Hospital

- Hospitalization can decrease total sleep time, sleep efficiency and REM sleep
- Pre-existing sleep disorders can be aggravated or even triggered
- Medications used on patients in the hospital can have side effects resulting in the loss of sleep for patients
- The environment is noisy during the day and night which can result in difficulty sleeping, as well as, daily hospital routines that are done on patients, such as vitals, can also cause a disruption in sleep
- Sleep disturbance patterns from the hospital can continue to affect patients when they go home and ultimately affect their long term recovery, health and well-being
- As a nurse we have the duty to create an environment that is helpful for sleep (ie: reducing light, giving ear plugs for noise, doing patient care at appropriate times)
Narcolepsy

- Sleep disorder characterized by excessive daytime sleepiness and intermittent, uncontrollable episodes of falling asleep during the daytime
- Associated with damage to a small group of cells in the brain that produce the neurotransmitters orexin and hypocretin
- It is not clear what causes these orexin producing cells to become damaged
- These sudden sleep attacks may occur during any type of activity at any time of the day. Symptoms of narcolepsy include:
  - Excessive daytime sleepiness (EDS)
  - Cataplexy
  - Hallucinations
  - Sleep paralysis
- Drug management of narcolepsy includes:
  - Amphetamine-like stimulants
  - Antidepressants
  - Dextroamphetamine
  - Methamphetamine
  - Modafinil
Circadian Rhythm Disorder

- Can occur when the circadian timekeeping system loses its coordination with the environment.
- Lack of coordination between the circadian rhythm and the environment results in a disrupted sleep-wake cycle and affects the quality of sleep.
- Common symptoms: insomnia and excessive sleepiness.
- **Jet Lag Disorder**: when an individual crosses multiple time zones resulting in the person’s body time and environment time being uncoordinated.
- Resynchronization of the body’s clock with the environment occurs at a rate of 1hr/day travelling eastward and 1.5hrs/day travelling westwards.
- To reduce jet lag, one can sync their sleep schedules with the schedule of the destination or stick to your home based sleep hours when travel is super short (ie: <2 days).
Sleep-Disordered Breathing (SDB)

- SDB is characterised by abnormal respiratory patterns associated with sleep.
- Examples include:
  - Snoring
  - Apnea
  - Hypopnea
- Most commonly diagnosed SDB is obstructive sleep apnea where partial or the complete airway is obstructed during sleep.
- Airway obstruction occurs due to narrowing of the air passages with relaxation of muscle tone during sleep.
- The tongue and soft palate fall backward.
Periodic Limb Movement Disorder

- Characterized by involuntary, continual movement of the legs and/or arms during sleep
- Movements typically occur for 0.5-10 seconds in 5-90 second intervals
- **Restless Legs Syndrome:** disorder that causes individuals to have irresistible urges to move their legs to relieve uncomfortable sensations they get in their legs
- PLMD and restless legs syndrome (RLS) often occur simultaneously
- Below is a video showcasing periodic limb movement disorder:

  https://www.youtube.com/watch?v=r7RuU3BMKP0
Parasomnias

- Unusual and often undesirable behaviours that happen with sleep or during arousal from sleep
- Parasomnias during REM sleep due to the CNS activation and complex behaviors include: enuresis, hallucinations & eating
- Arousal parasomnias include: sleepwalking, sleep terrors & nightmares

  - **Sleepwalking**: can range from sitting up in bed, moving objects, walking around
    - Individuals usually do not speak & have limited awareness of the event
    - Individual does not remember the event after waking up
  
  - **Sleep terrors**: a sudden awakening from sleep along with a loud cry & signs of panic
    - Intense autonomic response: increased heart rate, respiration & diaphoresis
  
  - **Nightmares**: recurrent awakening with recall of the frightful or disturbing dream
Effects of Sleep Deprivation on Health

- Sleep disorders increases chances of mortality and morbidity in patients with chronic illnesses especially CVD and stroke
- Sleep disorders affect cardiometabolic risk outcomes, as well as, result in a negative energy balance which can put individuals at risk for obesity, hypertension, type 2 diabetes mellitus & CV disease
- Treating individuals with sleep disorders can result in health benefits, especially for blood pressure
Effects of Sleep Deprivation on Health

- Irritability
- Cognitive impairment
- Memory lapses or loss
- Impaired moral judgement
- Severe yawning
- Hallucinations
- Symptoms similar to ADHD
- Increased heart rate variability
- Risk of heart disease
- Decreased reaction time and accuracy
- Tremors
- Aches
- Impaired immune system
- Risk of diabetes Type 2

Other:
- Growth suppression
- Risk of obesity
- Decreased temperature
What happens to your body & brain if you are not getting enough sleep?

The following is a video by Matthew Walker, who is a sleep expert and professor of neuroscience and psychology. He explains what happens to our brains and bodies if we are sleep deprived!

https://www.youtube.com/watch?v=Y-8b99rGpkM
References