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Sleep

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Goals

- Importance of sleep
- Patterns and stages of sleep
- Describe normal developmental stage sleep changes across the lifespan
- Identify sleep disorders and their consequences
- Discuss ways to improve your quality and quantity of sleep

What is sleep?

- Sleep is a dynamic and regulated set of behavioral and physiological states during which many processes vital to health and well-being take place
- During sleep, most of the body's systems are in an anabolic state, helping to restore the immune, nervous, skeletal, and muscular systems
  - these are vital processes that maintain mood, memory, and cognitive performance and plays a large role in the function of the endocrine and immune systems

Why is sleep important?

- Cognitive and physical performance
- Learning and memory consolidation
- Mood enhancement
- Protects the immune system
- New evidence shows a relationship between lack of sleep to weight gain and aging

Institute of Medicine Report

- **"An Unmet Public Health Problem"**
  - *"The cumulative effects of sleep loss and sleep disorders represent an under-recognized public health problem and have been associated with a wide range of health consequences including an increased risk of hypertension, diabetes, obesity, depression, heart attack, and stroke."*
  - *"**Almost 20 percent of all serious car crash injuries in the general population are associated with driver sleepiness.** Hundreds of billions of dollars a year are spent on direct medical costs related to sleep disorders such as doctor visits, hospital services, prescriptions, and over-the-counter medications."*

Sleep Statistics

- We spend 1/3 of our lives asleep
- Sleep is an active process
  - no organ or regulatory system “shuts down”
    - metabolic rate decreases slightly
- Some brain activity increases during sleep
  - many parts of the brain are as active as awake periods
  - at least 2 hours of dream state per night
- Specific hormones increase during sleep
  - growth hormone
  - melatonin

Sleep Statistics

- 50% of Americans are sleep deprived (close to 70 million people)
  - 37% of adults state they are so tired during the day it interferes with daily activities
- 7 out of 10 have trouble sleeping
- 40 million suffer from some long-term sleep disorder
- 20 million experience occasional sleep problems
- 1/3 of Americans have symptoms of insomnia
- 55% of adults nap at least once during the week
- 75% of adults experience at least one symptom of sleep disorder a few nights a week or more

Why aren't we sleeping?

- Sleep deprivation (work, lifestyle)
- Poor sleep habits
- Stress (can't get brain to "shut off")
- Circadian factors (shift work)
- Environmental disruptions
  - light/TV/radio
  - traffic
  - room temperature
- Untreated sleep problems/disorders
- Electronics, blue light
- Pain/illness
  - arthritis, digestive disorders

Why aren't we sleeping?

- Medications
- Pregnancy
- Aging
  - menopause, hot flashes
  - more nocturnal awakenings
  - 1/3 of older adults have insomnia
  - dementia
- Chronic diseases
  - obesity: 40% have sleep apnea
  - diabetes: 50% have sleep apnea

Adverse Health Outcomes

- Physiological, behavioral/cognitive, emotional and/or social responses
- Increased risk of obesity and hypertension
- Decreased immune system functioning
- Impaired daytime functioning
  - decreased alertness
  - poor memory
  - decreased school or workplace performance

Effects of Sleepiness in the Workplace

- Impaired reaction time, judgement, and vision
- Problems with information processing and short-term memory
- Decreased performance, vigilance, and motivation
- Increased moodiness and aggressive behaviors
- Increased “microsleeps”- brief 2-3 second sleep episodes

Effects of Sleepiness in the Workplace

- Sleepy people report having difficulty with:
  - 68% concentration
  - 65% handling stress
  - 57% listening
  - 38% relating to others
  - 57% solving problems
  - 56% decision making
  - 14% are late to work
  - 4% stay home from work
  - 7% fall asleep at work
  - 19% make errors
  - 2% get injured

Sleep Throughout the Lifespan

- Newborn and infant sleep
  - newborn sleep has 2 stages:
    - 50% quiet or non-rapid eye movement sleep
    - 50% active or rapid eye movement (REM) sleep
  - total sleep time = 16-17 hours/24-hour time period with frequent awakenings for feeding and nurturing
- Children ages 1-5 years
  - amount of total sleep time decreases to 11-13 hours/ 24-hour period
  - generally sleep through the night
  - nap during the day as needed

Sleep Throughout the Lifespan

- Sleep in middle childhood (5-12 years)
  - total sleep time 10-12 hours
  - may experience sleep problems such as:
    - bedwetting
    - nightmares
    - sleepwalking
- Sleep in adolescents (12-18 years)
  - need ~9 hours of sleep for optimal health, emotional well-being, and cognitive functioning
  - often experience delayed sleep phase syndrome
    - can't go to sleep until late at night and prefer to sleep later in the morning
  - frequently do not get enough sleep

Sleep Throughout the Lifespan

- Sleep in adulthood
  - generally need 7.5-8 hours of sleep nightly
  - increasing frequency of problems sleeping including common sleep disorders
- Sleep in aging adults (65+ years)
  - still need ~7-8 hours of sleep nightly
  - may decrease to 6 hours of sleep with naps common during the day
  - increased number of nighttime awakenings
  - frequently awake very early in the morning
  - sleep is often impacted by illness and medications

Sleep Patterns

- 5 stages of sleep during a normal night
- Stages 1-4 or non-REM and REM
  - during non-REM sleep, many of the restorative functions of sleep occur
  - during REM sleep, memories and thoughts from the day are processed
- Stages progress cyclically
- One complete cycle takes about 90-110 minutes
- First cycles have a short REM sleep
- REM sleep time increases in later cycles

Sleep Stages

- Stage 1
  - light sleep, drift in and out, awaken easily
  - eyes move slowly, muscle activity slows
  - may experience a sense of falling followed by sudden muscle contractions
- Stage 2
  - eye movement stops
  - brain waves are slower, occasional bursts of rapid waves

Sleep Stages

- Stage 3
  - considered deep sleep
    - non eye or muscle movement, difficult to awaken
    - time when sleep-walking, bed wetting, or terrors occur
- Stage 4
  - considered deep sleep also

REM Sleep

- Brain waves increase to the awake level
- Most dreams occur during this state
  - if awoken in this state, most people remember their dreams
- Physical changes during REM
  - increase in heart rate, blood pressure and breathing rate
  - breathing: more shallow and irregular
  - eyes jerk rapidly
  - limb muscles temporarily paralyzed

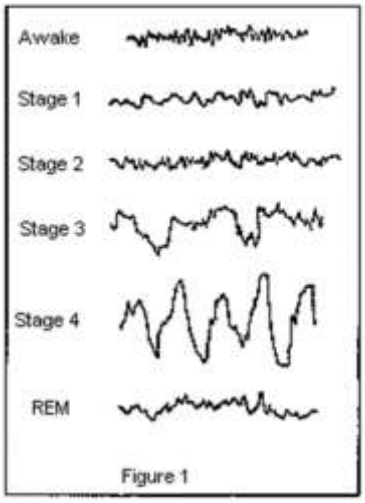

Figure 1

REM Sleep

- Most people have 3-5 intervals of REM each night
- Infants spend 50% of the time in REM
- Adults spend 20% of time in REM
  - this percentage decreases with aging

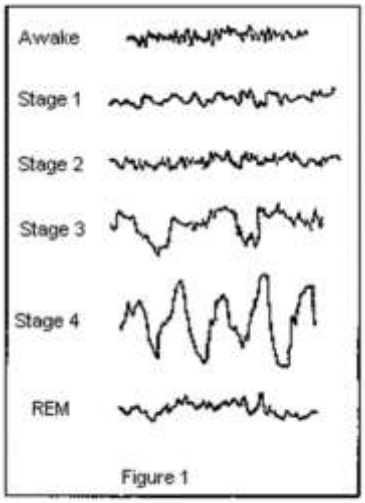

Figure 1

Common Sleep Problems

- Insomnia
  - defined as trouble falling asleep or staying asleep
  - may be due to stress, anxiety, hormonal changes, lifestyle, environmental factors, physical ailments, or psychiatric illness
  - affects more than 50% of all U.S. adults
- Obstructive sleep apnea
  - during sleep, breathing pauses or stops for 10-20 seconds or more, 20-30 times an hour
  - oxygen levels drop, normal breathing starts again with a loud snort
  - results in excessive daytime sleepiness
  - often associated with being overweight or obese
  - can be treated with a continuous positive airway pressure (CPAP) machine
  - affects approximately 18 million Americans

Common Sleep Problems

- Narcolepsy
  - chronic neurological disorder caused by the brain's inability to regulate sleep-wake cycles normally
  - frequent urges to sleep occurring anytime
  - can cause involuntary falling asleep at school, work, or anywhere
- Restless leg syndrome
  - neurological disorder resulting in an unpleasant sensation in the legs and uncontrolled urge to move when resting in an attempt to relieve these feelings
  - affects nearly 12 million Americans

Tips to Promote Sleep

- Maintain a regular bed and wake time schedule including weekends
- Establish a regular, relaxing bedtime routine
- Create a dark, quiet, comfortable, and cool sleep environment
- Sleep on a comfortable mattress and pillow
- Use your bedroom only for sleep, not work or other stressful activities
- Finish eating at least 2-3 hours before your regular bedtime
- Exercise regularly
  - it is best to complete your workout at least a few hours before bedtime (150 minutes per week)
- Avoid caffeine, nicotine, and alcohol close to bedtime
  - they can disrupt sleep later in the night
- Avoid napping if it will disrupt your sleep later that night

Summary

- Sleep is a basic, biological need that is essential to our health, performance, safety, and quality of life
- Sleep deprivation has serious negative consequences, especially at work
- Signs and symptoms of sleep difficulties need to be identified and discussed with a doctor
- Establishing healthy sleep practices prevents sleep problems and promotes optimal sleep

Sleep

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