Rest and Sleep

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LEARNING OBJECTIVES

After mastering the contents of this lecture, the student should be able to:

1. Explain the functions and the physiology of sleep.
2. Identify the characteristics of NREM and REM sleep.
3. Identify the four stages of NREM sleep.
4. Identify factors that affect normal sleep.
5. Describe common sleep disorders.
6. Identify the components of a sleep pattern assessment.

TERMINOLOGIES

Hypersomnia
Insomnia
Narcolepsy
Nightmares
Parasomnias

Rest
Sleep
Sleep Apnoea
Thermoregulation
Rest and Sleep

Introduction

Rest and sleep are fundamental components of wellbeing. All individuals require certain periods of calm and lesser activity so that their bodies can regain energy and rebuild stamina.

The need for rest and sleep varies with age, developmental level, health status, activity level, and cultural norms.

Rest refers to a state of relaxation and calmness, both mental and physical; the nurse should try to understand what activities and environments the client defines as restful.

Sleep refers to a state of altered consciousness during which an individual experiences minimal physical activity and a general slowing of the body’s physiological processes.

As a restorative function, sleep is necessary for physiological and psychological healing to occur. It is important for clients, their significant others, and health care providers to understand the normal sleep-wake cycle and how sleep affects mood and healing.

Physiology of sleep

Sleep-wake cycle is regulated by multiple sleep and wake promoting systems, which are spread all over in the brain.

Sleep begins with activation of the preoptic area of the anterior hypothalamus. Sleep promoting neurons project to wake-promoting centers and inhibit them with γ-aminobutyric acid as neurotransmitter. The inhibition of wake-promoting neurons works on other sleep-promoting neurons and activates them, which results in intensifying the sleep process.
**Functions of sleep**

1. **Conservation of energy:** the main arguments for the purpose of sleep as reservation of energy.
2. **Restoration of tissues and growth:** during the first hours of sleep growth hormone excretion, cell mitosis and protein synthesis are increased.
3. **Thermoregulation.**
4. **Regulation of emotions:** in humans the sleep deprivation causes the disturbances of emotional behavior (such as concentration, interest for distinct goal, etc.).
5. **Neural maturation:** The percentage of REM sleep of total sleep time decreases with age - in about 6 month of prenatal phase the children spend about 80% of sleep in REM sleep, but young adult people only 25%.

6. **Memory and learning:** There is an information transfer between cortex and hippocampus during the sleep that realizes the fixation of memory traces or during REM sleep the insignificant bindings are abolished.

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**Sleep phases**

Electroencephalograph (EEG) patterns, eye movements, and muscle activity are used to identify stages of sleep. The stages of sleep are classified in two categories: 

**Non-rapid eye movement (NREM)** and **rapid eye movement (REM)** sleep.

**NREM Sleep**

With the onset of sleep, the heart rate and respiratory rate slow slightly and remain regular. This first phase of sleep is referred to as non-rapid eye movement, or NREM, sleep. NREM sleep consists of four different stages. As the client enters stage 1 sleep, there is a general slowing of EEG frequency but an appearance of wave spikes; the eyes tend to roll slowly from side to side, and muscle tension remains absent except in the facial and neck muscles.

In adult clients with normal sleep patterns, stage 1 sleep usually lasts only 10 minutes or so. Stage 1 NREM sleep is of a very
light quality, which means that during this stage a sleeper can be easily awakened.

Stage 2 sleep is still fairly light sleep, with a further slowing of EEG patterns and loss of slow rolling eye movements. 50% of normal adult sleep may be spent in stage 2. After an initial 20 minutes or so of stage 2 sleep, a deep form of sleep called stage 3 to 4 is entered.

Stage 3 and stage 4 sleep are frequently discussed together because of the difficulty of identifying and separating the two. Stage 3 refers to medium-depth sleep, and stage 4 signals the deepest sleep. During these stages, all cortical brain cells appear to be firing at the same time, resulting in large slow waves on the EEG. When roused from stage 3 to 4 sleep, an adult can take 15 seconds or so to become fully awake. This difficulty in awakening is even more pronounced in children. Stage 3 to 4 sleep is where most sleepwalking, sleep talking, enuresis, and night terrors occur.

Stage 3 to 4 sleep is felt to have restorative value, necessary for physical recovery. After sleep deprivation studies, stage 3 to 4 sleep is the first to be regained. The majority of growth hormone is secreted at night, peaking during stage 3 to 4 sleep near the beginning of a sleep period. Growth hormone is required not only for growth but also for normal tissue repair in clients of all ages. Stage 3 to 4 sleep accounts for approximately 25% of sleep in children, declines slightly in young adulthood, then gradually declines in middle age and may be absent in elderly clients.

**REM Sleep**

After the initial 90 minutes or so of NREM sleep in adults, the client enters rapid eye movement, or REM, sleep. The EEG pattern
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resembles that of the awake state; there are rapid conjugate eye movements; heart rate and respiratory rate are irregular and often higher than when awake; and muscles, including those of the face and neck, are flaccid, leaving the body immobilized. Dreams occur 80% of the time clients are in REM sleep. Unlike stage 3 to 4 sleep, which is most abundant during the early portion of a sleep period, REM sleep periods become longer as the night progresses and the individual becomes more rested. An adult typically has four to six REM sleep periods through the night, accounting for 20% to 25% of sleep. REM sleep makes up 50% of sleep in the newborn, then gradually declines to 20% to 25% of sleep by early childhood and remains fairly constant throughout the remainder of the life span.

Sleep cycles

A sleep cycle refers to the sequence of sleep that begins with the four stages of NREM sleep in order, with a return to stage 3, then 2, and then passage into the first REM stage (Fig. 2). The duration of a sleep cycle is generally between 70 and 90 minutes, and the typical sleeper will pass through four to six sleep cycles during an average sleep period of 7 to 8 hours.

Fig. (2): The sleep cycle
Factors affecting sleep

1. **Degree of Comfort:** The nurse must assess the degree to which the client’s physical and psychological needs have been met.

2. **Anxiety:** When trying to go to sleep, many individuals often have intrusive thoughts or muscular tension, which interfere with rest and sleep.

3. **Environment:** Environmental factors can either enhance or impair sleep. Lighting, temperature, odors, ventilation, and noise level can all interrupt the sleep process when they differ from the norms of the client’s usual sleep environment.

4. **Lifestyle:** A fast-paced life filled with multiple stressors can result in the person’s inability to relax easily or to fall asleep quickly. Relaxation precedes healthy sleep.

5. **Diet:** The type of food consumed has an impact on the quality and quantity of sleep. Foods high in caffeine, such as coffee, colas, and chocolate, serve as stimulants and often disrupt the normal sleep cycle. Also, consuming a large, heavy, or spicy meal just before bedtime may cause indigestion, which will likely interfere with sleep.

6. **Drugs and Other Substances:** Alcohol and nicotine use can impair sleep. Small amounts of alcohol may help some people fall asleep; however, in others alcohol may interfere with REM sleep, causing very restless and no refreshing sleep.

7. **Cultural Norms:** Some people perceive sleep as a luxury to be indulged in when they are not too busy with “important” activities. Others view sleep as an absolute necessity.
8. Life Span Considerations: A person’s need for sleep changes with age in a fairly predictable pattern.

Sleep assessment

Discussion of sleep habits is included as part of the regular health history. Any client acknowledging a sleep disturbance should be thoroughly assessed to determine sleep routines, sleep alterations, type of disturbances, and impact of sleep problems.

Questions regarding the client’s usual sleep patterns should include:
1. Nature of sleep (restful, uninterrupted).
2. Quality of sleep (usual sleep pattern, schedules, hours of sleep, feeling on waking).
3. Sleep environment (description of room, temperature, noise level).
4. Associated factors (bedtime routines, use of sleep medications or any other sleep inducers).
5. Opinion of sleep (adequate, restores energy adequately, inadequate, problematic).

Questions regarding altered sleep patterns are intended to discover such information as:
1. Nature of the problem (inability to fall asleep, difficulty remaining asleep, inability to fall asleep after awakening, restless sleep, daytime sleepiness).
2. Quality of the problem (number of hours of sleep versus number of hours spent trying to sleep, number of hours of sleep a night, duration and frequency of naps or other compensatory measures, number of wakings per sleep period).
3. Environmental factors (lighting, bed, noise level, surrounding stimulation, sleep partner).

4. Associated factors (relation to meals eaten, activity before retiring, life stressors, work stressors, anxiety level, pain, recent illness or surgery).

5. Alleviating factors (mild diet, warm drink before retiring, reading a book, listening to quiet music, taking a hot bath, taking sleeping pills).


Common sleep disorders

Sleep disorders may be categorized as parasomnias, primary disorders and secondary disorders.

*Parasomnias* are disruptive sleep-related disorders that can occur during arousals from rapid eye movement (REM) sleep or arousals from non-rapid eye movement (NREM) sleep. Parasomnias are characterized by undesirable physical or verbal behaviors, such as walking or talking during sleep occur in association with sleep, specific stages of sleep or sleep-wake transitions and can be divided into two groups—primary parasomnias and secondary parasomnias.

Primary parasomnias are disorders of sleep states, while secondary parasomnias are disorders of other organ systems that arise during sleep.
Types of parasomnias

- Nightmares
- Sleep terrors/night terrors
- Sleepwalking (somnambulism)
- Confusional arousals
- Sleep paralysis
- REM sleep behavior disorder (RBD)
- Sleep enuresis

Primary sleep disorders are those in which the person’s sleep problem is the main disorder. These disorders include insomnia, hypersomnia, narcolepsy, sleep apnoea and sleep deprivation.

Insomnia

Insomnia, the most common sleep disorder, is the inability to rain an adequate amount or quality of sleep. People suffer- from insomnia do not feel refreshed on arising.

There are three types of insomnia:
1. Difficulty in falling asleep (initial insomnia).
2. Difficulty in staying asleep because of frequent or prolonged waking (intermittent or maintenance insomnia).
3. Early morning or premature waking (terminal insomnia).

Insomnia can result from physical discomfort but more often is a result of mental overstimulation due to anxiety. People who become habituated to drugs or who drink large quantities of alcohol are likely to have insomnia.
Treatment for insomnia frequently requires the patient to develop new behaviour patterns that induce sleep. The usefulness of sleeping medications is questionable. Such medications do not deal with the cause of the problem and their prolonged use can create drug dependencies.

**Hypersomnia**

Hypersomnia, the opposite of insomnia, is excessive sleep, particularly in the daytime. The afflicted person often sleeps until noon and takes many naps during the day. Hypersomnia can be caused by medical conditions, for example, central nervous system damage and certain kidney, liver or metabolic disorders, such as diabetic acidosis and hypothyroidism.

**Narcolepsy**

It is referred to as a 'sleep attack'. Its cause is unknown, although it is believed to be a lack of the chemical hypocretin in the central nervous system that regulates sleep. Onset of symptoms tends to occur between ages 15 and 30. In narcoleptic attacks, sleep starts with the REM phase. Even though people who have narcolepsy sleep well at night, they nod off several times a day even when conversing with someone or driving a car. Narcolepsy historically has been controlled by central nervous system stimulants and antidepressants.

**Sleep Apnoea**

Sleep apnoea is the periodic cessation of breathing during sleep. This disorder needs to be assessed by a sleep expert. It is most frequent in men over 50 year and in postmenopausal women.
The periods of apnoea, which last from 10 seconds to two minutes, occur during REM or NREM sleep. Frequency of episodes ranges from 50-600 per night. These apnoeic episodes drain the person of energy and lead to excessive daytime sleepiness.

Three common types of sleep apnoea are obstructive apnoea, central apnoea and mixed apnoea.

Treatment for sleep apnoea can be directed at the cause of the apnoea. For example, enlarged tonsils may be removed. Other surgical procedures, including laser removal of excess tissue in the pharynx, reduce or eliminate snoring and may be effective in relieving the apnoea. In other cases, the use of a nasal continuous positive airway pressure (CPAP) device at night is effective in maintaining an open airway.

**Sleep Deprivation**

A prolonged disturbance in amount, quality and cons: sleep can lead to a syndrome referred to as sleep deprivation. This is not a sleep disorder in itself but a result of sleep disturbance. It produces a variety of physiological and behavioural symptoms, the severity of which depends on the degree of the deprivation.

**Secondary sleep disorders** are sleep disturbance-other clinical conditions. They may be associated with mental, neurological or other conditions. Examples of c causing secondary sleep disorders include depression, alcoholism, dementia, Parkinsonism, thyroid dysfunction, chronic obstructive pulmonary disease and peptic ulcer disease.
REFERENCES

