

Medi Quest BRS Hospital

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SLEEP HYGIENE AND SLEEP DISORDERS IN CHILDREN Part 1

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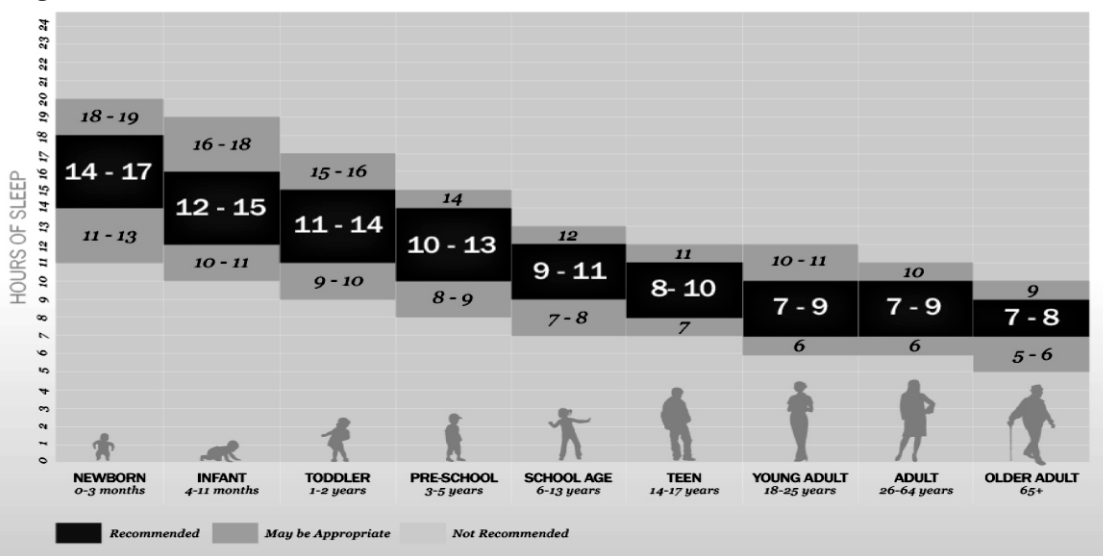
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During our lifetime we spend nearly 26years sleeping and another 7years trying to sleep which is a total of 33years spend in bed. Humans spend 1/3rd of their lives sleeping. Healthy sleep duration in children

Figure



Effects of sleep deprivation

Sleep deprivation.

- Mood – Anxiety, irritability, temper tantrum depression
- Cognition – Leading to poor concentration, poor memory difficulty in learning new tasks, drop in school performance
- Health – Hypertension, obesity and diabetes

What is sleep hygiene?

Sleep hygiene is a variety of different practices and habits that are necessary to have good nighttime sleep quality and full day time alertness.

Features of Healthy sleep

Falling asleep quickly
Staying asleep through the night
Rising without much trouble each morning
Not feeling drowsy during the day

Sleep latency not more than 15minutes.
No trouble some nighttime awareness
Refreshing sleep



**GENERAL MEDICINE , GENERAL SURGERY,
PEDIATRICS AND NEONATOLOGY
PLASTIC AND COSMETIC SURGERY ENT SURGERY,
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Stages of Sleep:

Sleep can be broadly segmented into rapid eye movement (REM) and non-REM sleep .

EEG for brain waves , EMG for muscle tone and Electro-oculography for eye movements must be used to determine stage of sleep.

One enters sleep from the drowsy state via NREM sleep.

NREM sleep is divided into 3 sub stages, stage N₁, stage N₂ and Stage N₃. Older rules had 4 stages of NREM sleep, in the current rules NREM Stage 3&4 are combined to stage N₃.

Stage N₁ :

Stage N₁ sleep is the typical transition from wakefulness to sleep. It is a stage of light sleep. Patients awakened from it usually do not perceive that they were actually asleep. It is characterized by low amplitude theta range for at least mixed EEG frequency in the (4 to 7Hz) 50% of the epoch. Stage N₁ sleep accounts for 5-10 percent or less of total sleep time in young adults.

Stage N₂ generally comprises the largest percentage of total sleep time.

It is characterized by theta EEG frequencies.

Two Distinct features of N₂ sleep that appear in the EEG

during stage N₂ are sleep spindles. and K complexes.

Stage N₃

EEG reveals high amplitude low frequency delta waves , characterised by deep sleep , difficult to arouse and occurs in the first half of the night.

REM Sleep

REM sleep (stage R) — REM sleep, also called stage R, is characterized by three primary features.

EEG demonstrates a low voltage, mixed EEG pattern. Sawtooth waves are a common finding during REM sleep; these 2-6 Hz wave patterns are sharply contoured and occur in brief bursts.

Rapid eye movements are the defining feature of the stage. These are defined on EOG by conjugate, irregular, sharply-peaked eye movements with an initial phase less than 500 milliseconds.

EMG demonstrates atonia, indicating inactivity of all voluntary muscles (except the extraocular muscles and the diaphragm). Atonia is the result of direct inhibition of alpha motor neurons.

Stages of sleep and EEG Findings

Stages of sleep and wake fullness	EEG waves	Clinical Importance
Awake Eyes open	β waves	
Awake Eyes closed	α waves	
NREM Sleep		
Stage N1		
Accounts for 5-10% of sleep time	Theta waves (4 7 Hz) -	Lightest stage of sleep Increased proposition suggest OAS or First night syndrome
Stage N2		
Accounts for 45-55% of sleep time	Theta waves + sleep spindles and K waves	Benzodiazepines increase N2 sleep

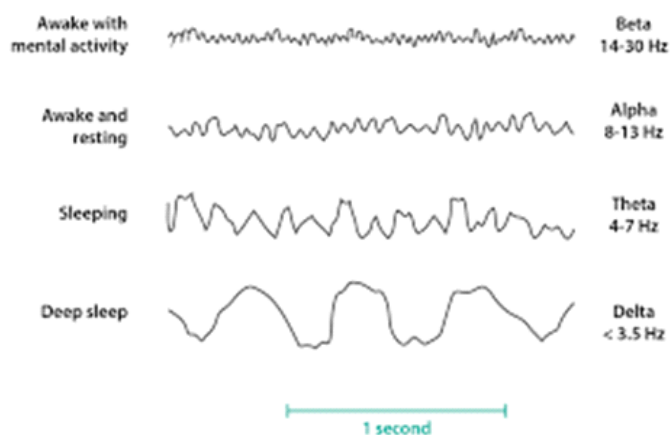


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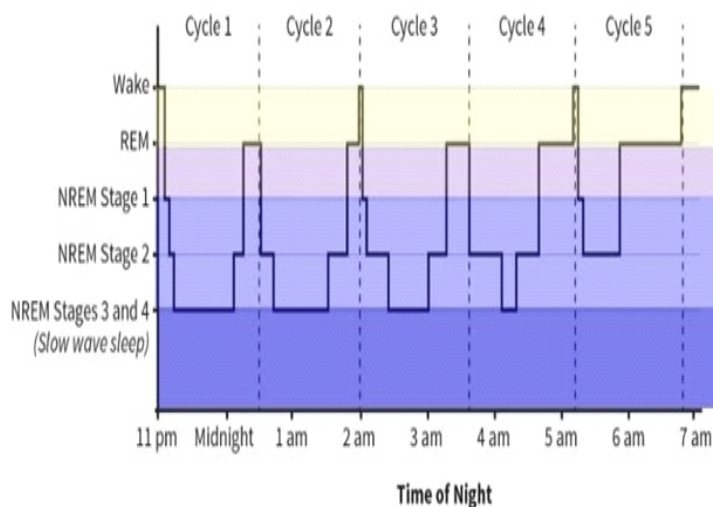
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Stages of sleep and wake fullness	EEG waves	Clinical Importance
Stage N3 Deep sleep / slow wave sleep Account for 10-20% of total sleep time	High amplitude low frequency 0.5-2 Hz) Delta waves	First half of the night, difficult to arouse during this stage. NREM parasomnias occur during this stage example sleep walking
REM Sleep also called Stage R occupies 18-23% of sleep time Rapid eye movements are the defining the feature of stage	EEG low voltage mixed EEG pattern saw tooth pattern -6Hz EOG irregular shortly peak movements which correspond to rapid eye movements EMG demonstrates atonia indicating inactivity of all voluntary muscles except EOM and Diaper	Associated with vivid dreaming. REM sleep part to be important for memory consolidation Respiratory muscle atonia during REM sleep aggravates OAS and leads to desaturation in COPD, neuromuscular disorder.



Arousals are defined by specific criteria. During sleep stages N1, N2, N3, or R, an arousal is scored if there is an abrupt shift of EEG frequency including alpha, theta and / or frequencies greater than 16Hz (but not spindles) that lasts at least 3seconds, with at least 10seconds of stable sleep preceding the change. Scoring of arousal during REM requires a concurrent increase in submental EMG lasting at least 1second.

Sleep Architecture:



Sleep consists of several sleep cycles. Sleep cycles are made up of REM Sleep and NREM Sleep. Each cycle lasting 90-120minutes. 4-5cycles occur during 8hrs night of sleep.

Sleep cycles trend in the following manner.

The first cycle of the night starts with transition from wake stage to N1 then to stage N2, N3 & then REM. The percentage of REM sleep increases and NREM sleep decreases during the course of the night.

New born infants sleep 16-18hrs a day without a circadian rhythm enter sleep through REM a opposed to NREM sleep. Around 3months of age they begun to develop day night cycle and enter sleep through NREM sleep.

Adult pattern of sleep are attained adolescents.

NREM Parasomnias or more likely to occur in the first half of the night when N3 sleep is more common.

REM Parasomnias occur in the second half of the night.

Potential functions of sleep:

The purpose of sleeping is poorly understood and the following theories or propounded.

1. Restoration and Revitalisation
2. Improved cognitive function and memory.

A brief over view of commonly encountered sleep disorders , their assessment , and management is discussed .

Chief sleep complaints:

The following are the most common sleep complaints

1. Difficulty initiating or maintaining sleep
2. Excessive day time sleepiness
3. Snoring or other breathing problem during sleep
4. Abnormal movements or behaviour before or during sleep

Specific sleep disorders:

1. Insomnia of Childhood Behavioural sleep problems in children
2. Sleep related movement disorders
3. Parasomnias of Childhood including sleep walking
4. Narcolepsy
5. Obstructive sleep apnoea in children

Medical problems leading to disturbances in sleep

1. Chronic or recurrent pain
2. GERD
3. Medications like stimulants used for ADHD
4. Asthma /Allergic Rhinitis
5. Infantile colic /Causes of incessant cry

Psychiatric Causes

Anxiety and Depression in the child

Sleep disorders involves the specialities of Pulmonology , ENT , Neurology and Psychiatry .

Next issue