

# *Insomnia*

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- Sleep is essential to health, sense of well-being and performance

Normal sleep comprises 2 states:-

- (1) Non-rapid eye movement NREM “quite sleep”:  
75-80% of sleep, with synchronous electroencephalogram, low muscle tone, minimal psychological activity, stages 1 to 4
- (2) Rapid eye movement REM “active sleep”:  
20-25% of sleep, with desynchronous electroencephalogram, atonic muscle, bursts of rapid eye movements, dreaming)
- NREM and REM sleep alternate through the night with approximately 90-minute cycle

- Manifestation of poor sleep = daytime sleepiness, insomnia and sleep-related events (eg. snoring, apnea, hallucination, sleep paralysis, abnormal behaviors)
- Aging → increase stage 1 and decrease stage 3/4 and REM. Insomnia common in  $\geq 65$  years old, 30% sleep maintenance problem and 50% prolonged sleep latency
- Insomnia in old 19-38.4%, associated with medical and chronic illness, psychological factors
- Daytime naps adversely affect nocturnal sleep in old age

- Insomnia can be triggered by variety of precipitating events, but when it becomes a persistent problem, psychological and behavioral factors are almost always involved in perpetuating or exacerbating sleep disturbances over time.

# *Insomnia*

= difficulty initiating or maintaining sleep + adverse daytime impairment (eg. fatigue, poor performance or emotional change)

■ *Risk factors of insomnia:-*

age, female, marital status, low income, limited education, work status and work-related stressors, health status (eg. neural, cardiovascular, gastrointestinal, respiratory, psychological or psychiatric disorder as depression, mood, stress, anxiety, substance abuse), behavioral and environmental factors (as stressful lifestyle, physical inactivity, irregular bedtimes, alcohol dependence, heavy caffeine use, smoking), seasonal change, social and occupational, circadian rhythm (shift work, travel etc.)

## ■ **Predisposing factors of insomnia :-**

sex, age, lower socioeconomic status, poor education, psychological, psychiatric (tense, anxious, nervous, irritable, tired, unable to relax, obsessively worried, depressed) or chronic medical illness (eg. neural, heart, liver, kidney, gastrointestinal, pulmonary diseases)

## ■ **Classification of insomnia :-**

- **Primary insomnia** – psychophysiological, paradoxical, adjustment, inadequate sleep hygiene, behavioral or idiopathic insomnia
- **Secondary insomnia** – secondary to medical or psychiatric illness, another sleep disorder or medication/substance abuse eg. late-life insomnia, hypnotic-dependent insomnia

# *Assessment of insomnia*

- Clinical interview:  
sleep history, drug use, medical history, psychiatric history, predisposing and precipitating factors, sleep-wake pattern, daytime symptoms, sleep environment and hygiene, lifestyle etc.
- Self-report questionnaires
- Psychological testing

# *Pathophysiology of insomnia*

- **Physiologic**: hyperarousal eg. metabolic rate, heart rate variability, neuroendocrine measures etc.
- **Cognitive**: life event and stress → rumination, worry (acting as predisposing, precipitating and perpetuating factors)
- **Behavioral**: sleep hygiene
- **Neurocognitive**: somatic, cognitive and cortical arousal

Moderated by homeostatic and circadian influences

# *Psychological and behavioral therapy of insomnia*

## **(1) Sleep restriction and compression therapy:-**

curtail time in bed to actual sleep time (no less than 5 hours) → mild sleep deprivation → more efficient sleep

## **(2) Stimulus control therapy:-**

reassociate bed/bedroom with sleep and reestablish sleep-wake schedule eg. go to bed only when sleepy, get out of bed when unable to sleep, curtail all sleep-incompatible activities (eg. eating, television, problem solving in bed), arise at regular time every morning regardless of amount of sleep the night before, avoid daytime napping.



■ **relaxation-based interventions:-**

reduce stress, tension and anxiety by relaxation (eg. progressive muscle relaxation, meditation, thought stopping etc.)

(4) **Cognitive therapy:-**

- correct intrusive thoughts at bedtime, misconceptions about sleep, insomnia and the next-day consequences
- alleviate insomnia-causing anxiety that arises from undue worrying and exaggerated fears related to sleep
- interrupt the vicious cycle of distress over poor sleep-provoking dysfunctional cognitions, leading to more sleep disturbance

## ■ **Sleep hygiene education:-**

lifestyle (diet, exercise, substance use eg. caffeine, nicotine, alcohol), environmental factors (light, noise, temperature, regular sleep schedule)

# *Drug therapy of insomnia*

## *(1) Benzodiazepine receptor agonists:-*

= first-line hypnotics for insomnia

- reduce sleep latency and increase total sleep time

### *(a) benzodiazepine hypnotics:*

triazolam (halcion)

flunitrazepam (rohypnol)

lormetazepam (loramet)

### *(b) nonbenzodiazepine hypnotics:*

zolpidem

zopiclone (imovane)

### *(c) nonhypnotics to aid sleep:*

diazepam (valium)

chlordiazepoxide (librium)

■ **Mechanism of action:**

GABA-benzodiazepine receptor at preoptic area of anterior hypothalamus → GABA inhibition → anxiolytic, muscle relaxant, sleep-inducing effects (decrease sleep latency and wake time after sleep onset, and total sleep time increased)

■ **Side effects:**

- residual sedation with the daytime → drowsy, sleepiness, impaired psychomotor performance
- anterograde amnesia (memory failure)
- rebound insomnia after discontinuation
- dependence
- risk of falls, cognitive decline

- **Sedating antidepressants:-**

eg. trazodone, amitriptyline and mirtazapine

- **Mechanism of action:** serotonin and  
norepinephrine receptors

- **Side effects:** dry mouth, perspiration,  
constipation, urinary retention,  
seizure, delirium

- (3) **Other drugs used as hypnotics:-**

antipsychotics (quetiapine, olanzapine)

antihistamines (hydroxyzine, diphenhydramine)

muscle relaxant (cyclobenzaprine)

melatonin