

Somnopathy-Medical Disorders of an Individual's Sleeping Patterns

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Key Points

- Sleep disorders interfere with physical, emotional & mental functioning.
- Treatment options available are pharmacological & non-pharmacological.

Sleep disorders involve problems with the quality timing, and amount of sleep, which result in daytime stress and impairment in functioning. Some sleep disorders are serious enough to interfere with normal physical, emotional, and mental functioning.

Sleep is a universal function of all living organisms. It comprises one-third of human life. Poor quality of sleep has been associated with a wide variety of dysfunction in most body systems. These include endocrine, higher cortical functions, metabolic, and neurological disorders. The most common sleep disorders are enlisted below:

Sleep Apnea

In the modern world, lack of a high nutritional diet and little to no physical activity have become major causes of increasing metabolic diseases in the masses. Obstructive Sleep Apnea Syndrome (OSAP) is a sleep disorder in which the person experiences short pauses in his/her breathing and an interrupted sleep rhythm. This syndrome is related to metabolic diseases, including obesity, insulin resistance, type 2 diabetes mellitus (T2DM), and non-alcoholic fatty liver disease (NAFLD).¹

Narcolepsy

Narcolepsy is a rare brain disorder that results in the dysfunction of orexin (also known as hypocretin) neurons of the lateral hypothalamus. Narcolepsy is identified by excessive daytime sleepiness and cataplexy, along with sleep-wake symptoms which include hallucinations, sleep paralysis, and disturbed sleep. Rapid eye movement sleep periods and deficiency of cerebrospinal fluid orexin are also experienced by the patient.²

Restless Legs Syndrome

Restless legs syndrome (RLS) is a sensorimotor disorder distinguished by an urge to move during rest. This urge is experienced by the patient during the night and disappears during movement. Severe forms of RLS influence sleep, quality of life, and mood. Periodic leg movement can be observed in the affected patient. RLS is influenced by genetic factors, and environmental factors and may occur with the presence of other diseases or conditions such as iron deficiency, kidney disease, cardiovascular diseases, diabetes mellitus, and neurological, rheumatological, and respiratory disorders. The pathophysiology is still uncertain involvement of brain iron deficiency, dysfunction in the dopaminergic and nociceptive systems, and altered adenosine and glutamatergic pathways as hypotheses are being investigated. RLS is a condition that is not acknowledged properly and is faultily diagnosed by physicians. Treatment guidelines for RLS suggest that doctors should remedy the syndrome by giving patients small amounts of dopamine agonists, or $\alpha 2\delta$ ligands if patients' conditions are critical. Other methods of ministrations include treatment with opioids and iron preparations. Dopaminergic treatment, although effective to begin with, can be very dangerous as relying on it for a long period can result in RLS symptoms getting aggravated.³

Sleep Paralysis

Sleep paralysis is characterized by the inability to move during sleep or awakening. During sleep paralysis, an individual hears footsteps or senses the presence of someone nearby. Most commonly occurs in ages 10 to 19. Potential interconnections with anxiety and circadian rhythm sleep-wake disorders are being investigated. Treatment may be done through behavioral and pharmacologic therapy.⁴

Parasomnias

Parasomnias are uncommon behaviors and/or experiences related to sleep and usually present themselves with varying motor movements. Sleepwalking (SW), sleep terrors (ST), confusional arousals, and related disorders result from an incomplete dissociation of wakefulness from nonrapid eye movement (NREM) sleep. NREM parasomnias are caused by hindering normal arousal mechanisms, and by conditions that further repeated prefrontal arousals and sleep inertia. Some things to note in sleepwalking patterns are the shifts in the cyclic alternating pattern which is a biomarker of arousal frailty. Sleep-related eating disorder (SRED) is distinguished by a disturbance of the nocturnal fast with instances of eating after arousal from sleep. The use of sedative-hypnotic medications, such as the commonly authorized benzodiazepine receptor agonists, is generally linked with SRED. Reliable independent corroboration indicates that, in some cases, nocturnal eating may be a nonmotor manifestation of Restless Leg Syndrome (RLS). Initially, parasomnias should be administered by concentrating on lessening any possible sleep-related wounds and injuries. After that, treatable sleep disorders must be tended to and any incriminating drugs should be gotten rid of. A subtype of arousal is a disorder known as Sexsomnia in which sexual behavior is triggered by an incomplete arousal from non-REM sleep. A common factor in REM sleep and non-REM sleep is that all overlapping parasomnia disorders involve abnormal sleep-related behaviors. A breakdown of the sleep design where a combination of sleep state markers is observed without any particular distinction is referred to as status dissociates. Benzodiazepine therapy can help in curing SW, ST, and Sexsomnia, but is not effective in controlling SRED. Reports have claimed that in several cases regarding ST, Paroxetine has also been useful in providing relief. Some medications that are useful for Sexsomnia are Topiramate, Pramipexole, and Sertraline. Pharmacotherapy for other parasomnias requires further investigation as it is not certain if it is still useful or not. NREM parasomnias might settle

impulsively, however common and predisposing factors require extensive analysis.⁵

Insomnia

Insomnia has been recognized as the most common sleep disorder and is experienced widely amongst the elderly. It is distinguished by well-known nighttime symptoms such as patients not being able to fall asleep and/or not being able to maintain their sleep. Daytime symptoms include mood swings and concentration difficulty.⁶ Development in the human comprehension of fundamental neurobiological mechanisms has been insubstantial, even though insomnia is the second most common mental disorder. The current review focuses on the definition and commonality of insomnia, assessing its subjective and objective attributes in the 24 hours of a day. Following that, the review largely focuses on addressing the fact that the liability of being diagnosed with insomnia is affected by factors such as genetic variants, early life stress, major life events, and brain function and structure. Evidence indicates that the risk of having insomnia is not found in the circuits of the brain that are associated with homeostatic and day-to-day sleep regulation but is rather found in circuits that regulate emotions and arousal. A testable model is then introduced that presents an analysis regarding people with insomnia. It states that the locus coeruleus of such people receives more input from or is more sensitive to the salience network and its related circuits. This happens during REM sleep as well. According to the model, this phenomenon may result in insufficient overnight adaptation to stress which may stockpile hyperarousal, damage the effects of restful sleep, and might also increase the risk of various other mental health issues. Sensitized brain circuits are individually encountered being referred to as "sleeping with one eye open". The suggested model proposes the idea of novel intervention studies and animal studies to further the development of the neuroscience of insomnia which is essential for greater therapy.⁷

Treatments

Treatments for sleep disorders depend on the type of sleep disorder. Treatment of insomnia can be broadly categorized into non-pharmacological and pharmacological treatments.

Non-pharmacological

- Cognitive behavioral therapy (CBT): these are psychological and behavioral techniques that can be helpful for treating insomnia. Depending on the specific symptoms, some of the techniques employed in CBT are:
- Sleep restriction therapy (SRT): SRT limits the total time allowed in bed so that the drive to sleep increases.
- Stimulus control therapy: it helps in changing sleep habits so that the patients don't have difficulty falling asleep. Patients should not go to bed until they are sleepy. Also, the bed should be used only for sleeping and not for watching television or reading books.
- Relaxation training: Relaxation techniques may be implemented before sleep. Meditation and breathing exercises are some of the relaxation techniques. It begins with being in a comfortable position and closing eyes. The mind and thoughts should be redirected towards a peaceful image, and relaxation should be allowed to spread throughout the body.
- Hypnosis: the hypnotherapist uses different therapeutic techniques like verbal repetition and mental images, which make the patient feel calm and relaxed, promoting restful sleep.
- Sleep hygiene: (see: patient education section).⁸

Pharmacologic

- Histamine type 1 receptor blockers: due to their sedative effects, these drugs can be helpful in patients with sleep disorders. However, due to their anticholinergic effect, these drugs should be avoided in the elderly.

Examples include chlorpheniramine and diphenhydramine.

- Benzodiazepines (BZD): these drugs are the mainstay in the treatment of insomnia. The drugs bind to a special benzodiazepine site on the gamma-aminobutyric acid (GABA) receptor complex, enhancing the activity of neurotransmitters. These drugs suppress REM sleep, reduce stage 3 sleep while increasing stage 2 sleep. Examples include flurazepam and temazepam.
- Non-benzodiazepine hypnotics: these agents are used for the treatment of acute and short-term insomnia. These drugs have non-BZD like chemical structures but interact with the GABA-BZD receptor, causing sedation. Examples include zolpidem and zaleplon.
- Melatonin receptor agonists: the melatonin receptors MT1 and MT2 are implicated in regulating sleepiness and the sleep-wake cycle. Melatonin receptor agonists act on these receptors and hence improve sleep through the endogenous regulating system. These drugs are used in circadian rhythm sleep disorders, jet lag, delayed sleep-wake phase disorder (insomnia with difficulty in sleep onset). Example includes ramelteon.
- Orexin receptor antagonists: orexin promotes wakefulness. Thus, the antagonism of this receptor helps in sleep. An example includes suvorexant.⁸

Conclusion

The effects of sleep problems can be so disturbing that one will want an immediate and strong relief for it. However, long term cases can take longer to resolve. In short, sticking to a healthy lifestyle can help prevent sleep disorders in the first place. Most sleep disorders once diagnosed can be treated with limited consultation. The first step is to treat any underlying condition that may be responsible for excessive sleepiness. However, the treatment of primary sleep disorders is best handled by a sleep specialist.

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