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SLEEP DISORDERS AND THEIR NEUROLOGICAL DISORDERS

Juraboyev Ahmadjon Anvarjon ugli

Kokand University, Andijan Branch

Faculty of Medicine, General Medicine Program

E-mail: a39497308gmail.com, tel: +998958382005

Annotation

This article discusses insomnia—namely, the main causes of sleeplessness, its clinical manifestations, diagnostic methods, and modern treatment approaches. Insomnia is a condition that significantly affects a person's general health, cognitive functions, and quality of life. Acute and chronic forms of insomnia, as well as the psychological, neurological, and somatic factors contributing to their development, are analyzed in depth. In addition, the importance of cognitive-behavioral therapy, pharmacological approaches, and sleep hygiene is highlighted. The article has practical significance for students and specialists studying sleep disorders associated with neurological problems.

Keywords

Insomnia, sleeplessness, sleep disorder, cognitive-behavioral therapy, sleep hygiene, neurological causes, psychological conditions, medications, stress, depression.

Sleep is a physiological process essential for human health, playing a crucial role in restoring the body's energy reserves, normalizing brain activity, and stabilizing mental condition. Sleep disturbances, in turn, lead to numerous physiological and psychological problems. These disturbances are especially closely related to neurological diseases and negatively affect a person's quality of life and daily functioning.

1. Physiology of Sleep

Sleep consists of two main stages: REM (rapid eye movement) and NREM (non-rapid eye movement) sleep. NREM sleep is further divided into 3–4 stages. During these stages, the physiological state of the body gradually changes. In the NREM stage, heart rate slows, body temperature decreases, and muscles relax. The REM stage is associated with information processing in the brain and dreaming. In healthy individuals, these two stages alternate several times during the night, determining the depth and quality of sleep.

Types of Sleep Disorders

Sleep disorders are diverse, each with distinct symptoms and causes.

Insomnia (sleeplessness) is the inability to achieve sufficient and quality sleep. It manifests as difficulty falling asleep, frequent awakenings during the night, or early morning awakening with inability to fall back asleep. Insomnia may be acute or chronic.

1. Causes of Insomnia

Stress and anxiety – daily life problems, work pressure, examinations, or family conflicts.

Psychiatric disorders – depression, anxiety disorders, post-traumatic stress disorder.

Somatic diseases – pain, cardiovascular, pulmonary, hormonal, or digestive system diseases.

Medications and stimulants – certain drugs (e.g., antidepressants, antihypertensive medications), caffeine, nicotine.

Poor sleep hygiene – evening use of mobile phones, exposure to light and noise, improper diet.

2. Diagnosis
Clinical interview – assessment of patient complaints, sleep diary, and lifestyle.
Psychological tests – identification of accompanying depression or anxiety disorders.
Polysomnography – evaluation of sleep phases, duration, and quality.
3. Treatment Methods
Cognitive-behavioral therapy (CBT-I) – the most effective treatment method, helping to correct maladaptive sleep habits.
Medications – melatonin, benzodiazepines, antihistamines, prescribed only under medical supervision.
Sleep hygiene – regular sleep and wake times, avoiding screens in the evening, light dinner, physical activity.
Hypersomnia is characterized by excessive daytime sleepiness, with persistent fatigue and lethargy. Even after a full night's sleep, the individual does not feel refreshed. Hypersomnia may be primary or secondary.
1. Causes of Hypersomnia
Narcolepsy – caused by deficiency of hypocretin, involved in regulating the sleep–wake cycle.
Sleep apnea syndrome – nighttime breathing pauses disrupt deep sleep and cause daytime sleepiness.
Depression and other psychiatric conditions – hypersomnia may be a core symptom of depressive episodes.
Neurological diseases – brain injuries, encephalitis, multiple sclerosis, Parkinson's disease.
Pharmacological factors – antipsychotics, sedatives.
Metabolic disorders – hypothyroidism, diabetes, liver or kidney failure.
2. Diagnostic Methods
Polysomnography – assessment of sleep quality and phase changes.
MSLT (Multiple Sleep Latency Test) – measures tendency to fall asleep during the day.
Anamnesis – evaluation of daily activity, sleep schedule, and fatigue level.
Blood and endocrine tests – to exclude hypothyroidism and other metabolic disorders.
3. Treatment Approaches
Elimination of the underlying cause.
Stimulant medications – modafinil, methylphenidate.
Lifestyle optimization – regular physical activity, sleep hygiene, stress reduction.
Psychotherapy – CBT is beneficial in psychologically induced hypersomnia.
Narcolepsy is a chronic disorder of the central nervous system characterized by impaired regulation of sleep and wakefulness. Patients experience sudden, uncontrollable sleep attacks during the day. The disease usually begins between ages 15–25 and persists throughout life.
1. Main Symptoms
Excessive daytime sleepiness.
Cataplexy – sudden muscle weakness triggered by strong emotions while consciousness is preserved.
Hypnagogic hallucinations – vivid dream-like experiences before falling asleep.
Sleep paralysis – temporary inability to move when falling asleep or waking.
Early onset of REM sleep – occurring within 15 minutes instead of 90.
2. Causes
Hypocretin (orexin) deficiency.
Autoimmune mechanisms.
Genetic predisposition (HLA-DQB1*06:02).
Viral infections.

3. Diagnosis
Polysomnography (PSG).
Multiple Sleep Latency Test (MSLT).
Measurement of hypocretin levels in cerebrospinal fluid (rare).
4. Treatment
Improved sleep hygiene.
Medications: modafinil, armodafinil, sodium oxybate.
Antidepressants (SSRI/SNRI).
Psychological support.
Parasomnia refers to abnormal involuntary behaviors or experiences occurring during sleep or upon awakening. It is more common in childhood but may persist into adulthood.
1. Types of Parasomnia
a) NREM parasomnias:
Sleepwalking (somnambulism).
Sleep talking (somniloquy).
Night terrors.
b) REM parasomnias:
REM sleep behavior disorder (RBD).
Nightmares.
2. Causes
Genetic predisposition.
Stress and psychological pressure.
Poor sleep hygiene.
Medications or substances.
Neurological diseases (epilepsy, Parkinson's disease).
3. Diagnosis and Treatment
Anamnesis.
Polysomnography.
Treatment includes improving sleep hygiene, psychotherapy, and medications in severe cases.
Sleep apnea is a serious sleep disorder characterized by repeated pauses or significant reduction in breathing during sleep, leading to oxygen deficiency and frequent awakenings.
1. Types
Obstructive sleep apnea (OSA).
Central sleep apnea (CSA).
Mixed sleep apnea.
2. Symptoms
Loud snoring.
Nighttime choking.
Daytime fatigue and headaches.
Concentration difficulties.
Frequent nocturnal urination.
3. Causes and Risk Factors
Obesity.
Upper airway structural abnormalities.
Male sex and older age.
Alcohol and sedative use.
Smoking.
4. Diagnosis

Polysomnography.
Home sleep tests.
5. Treatment
Lifestyle modification.
CPAP therapy.
Oral appliances.
Surgical interventions.
Medications (in selected cases).

Sleep is a vital physiological need essential for brain and body recovery. Sleep disorders pose serious health risks and are closely linked to neurological causes. Research shows that reduced sleep quality adversely affects brain function, memory, emotional state, and cardiovascular health. Neurological diseases such as epilepsy, Parkinson's disease, Alzheimer's disease, brain injuries, and tumors directly or indirectly impair sleep quality.

Modern diagnostic methods—polysomnography, electroencephalography, and clinical observation—play a key role in identifying sleep disorders. Treatment requires an individualized approach, including medications, lifestyle changes, psychotherapy, and modern device-based therapies such as CPAP.

Early diagnosis and comprehensive treatment of sleep disorders significantly improve quality of life. In-depth study of their neurological basis provides a foundation for effective diagnosis and therapy. This article serves as an important theoretical and clinical guide for future neurologists and practicing physicians.

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