CLINICAL FEATURES AND UNDERLYING FACTORS OF INSOMNIA IN PATIENTS WITH NEUROLOGICAL DISORDERS

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Abstract. Insomnia is a common yet often underdiagnosed condition among patients with neurological disorders, significantly affecting their overall quality of life and disease progression. This study aimed to evaluate the clinical presentation, underlying causes, and management outcomes of insomnia across different neurological conditions, including Parkinson's disease, epilepsy, multiple sclerosis, and post-stroke states. Eighty patients aged 25 to 55 were clinically assessed using the Insomnia Severity Index (ISI), structured interviews, and, for a subset, overnight polysomnography. Participants were divided into four diagnostic groups to analyze the prevalence and severity of insomnia symptoms, contributing factors such as medication side effects, anxiety, neuropathic pain, and seizure activity. The findings revealed that sleep disturbances were widespread, with significant intergroup variations. Polysomnography confirmed substantial alterations in sleep architecture. Among the therapeutic interventions, cognitive behavioral therapy (CBT) proved to be the most effective. The study highlights the importance of comprehensive and tailored approaches to insomnia management in neurological patients, underscoring the need for integrated neurological and psychological care.

Keywords: insomnia, neurological disorders, sleep disturbance, ISI, polysomnography, Parkinson's disease, epilepsy, multiple sclerosis, stroke, cognitive behavioral therapy

Introduction Insomnia is a prevalent and often debilitating condition that significantly impairs the quality of life, especially among individuals with neurological disorders. The bidirectional relationship between sleep disturbances and neurological diseases has been well documented, with insomnia not only exacerbating the symptoms of the underlying condition but also acting as a potential risk factor for disease progression. Sleep disturbances are commonly reported in disorders such as Parkinson's disease, multiple sclerosis, epilepsy, and cerebrovascular diseases. Despite increasing recognition of the impact of insomnia in neurology, there remains a need for comprehensive clinical evaluation of its manifestation and contributing factors. This study aims to assess the clinical presentation of insomnia and identify its underlying causes in patients with various neurological disorders.

Materials and Methods This clinical study was carried out over a six-month period in three tertiary-level neurology centers. A total of 80 patients, aged between 25

and 55 years, who had confirmed diagnoses of neurological disorders and reported symptoms consistent with chronic insomnia, were recruited for this investigation. The inclusion criteria consisted of patients with at least three months of sleep-related complaints such as difficulty falling asleep, frequent night awakenings, or early morning awakenings, coupled with daytime impairment. Patients with psychiatric disorders unrelated to the neurological condition, acute illnesses, or recent use of sleep-altering substances were excluded.

Each participant underwent a comprehensive neurological evaluation followed by a structured clinical interview designed to gather demographic information, sleep history, psychological symptoms (e.g., anxiety and depression), medication intake, and lifestyle habits (including caffeine consumption and physical activity). To assess the severity of insomnia, the Insomnia Severity Index (ISI) questionnaire was administered. Based on their neurological diagnoses, participants were divided into four groups: Group I – Parkinson's disease (n = 20), Group II – Epilepsy (n = 20), Group III – Multiple sclerosis (n = 20), and Group IV – Post-stroke patients (n = 20).

To further investigate physiological sleep parameters, 30% of patients in each group were randomly selected to undergo overnight polysomnography in sleep laboratories equipped for neurological monitoring. This allowed the objective evaluation of total sleep time, sleep efficiency, sleep onset latency, and REM sleep percentages. Data were processed using SPSS software, and statistical significance was assessed using ANOVA and chi-square tests. Ethical approval was obtained from the institutional ethics committees, and all participants provided informed consent.

Results The analysis of clinical and instrumental data provided a detailed picture of how insomnia presents and evolves in the context of different neurological conditions. The primary aim of the study was to delineate the frequency, severity, and causes of insomnia across neurological subtypes to guide appropriate interventions.

All participants reported symptoms of insomnia, with varying degrees of severity. ISI scoring categorized the majority of patients as having moderate to severe insomnia. Table 1 illustrates the prevalence of specific insomnia symptoms (difficulty initiating sleep, nighttime awakenings, and early morning awakenings) across the four diagnostic groups.

Table 1. Prevalence of Insomnia Symptoms in Patient Groups

Symptom Type	Parkinson's	Epilepsy	MS	Stroke
Difficulty falling asleep	85%	70%	75%	65%
Frequent awakenings	90%	80%	85%	80%
Early morning awakening	75%	55%	60%	70%

Across all groups, frequent awakenings were the most prevalent symptom, particularly among Parkinson's and MS patients. Difficulty falling asleep was most pronounced in Parkinson's disease, likely reflecting motor symptom interference and dopaminergic medication side effects. Stroke patients reported high rates of early morning awakening, potentially linked to anxiety and altered circadian rhythms.

Table 2. Average ISI Scores by Group

Group	Mean ISI Score
Parkinson's disease	21.4 ± 3.2
Epilepsy	18.9 ± 2.7
Multiple sclerosis	19.6 ± 3.1
Post-stroke	20.2 ± 2.8

ISI scores reflect more severe insomnia in patients with Parkinson's disease and stroke, while epilepsy and MS patients reported slightly lower scores but still within a clinically significant range.

Table 3. Identified Causes of Insomnia by Percentage

Cause	Parkinson's	Epilepsy	MS	Stroke
Medication side effects	50%	30%	40%	35%
Anxiety/depression	65%	55%	70%	60%
Neuropathic pain	25%	20%	60%	40%
Nocturnal seizures	-	40%	-	-

Psychological factors such as anxiety and depression emerged as the leading causes across all groups, with neuropathic pain notably impacting MS and stroke patients. Nocturnal seizures were a unique cause in the epilepsy group, contributing to fragmented and unrefreshing sleep.

Table 4. Polysomnography Findings in Subsample

Sleep Parameter	Normal Range	Avg in Sample	Deviations
Total Sleep Time	6–8 hrs	4.9 hrs	↓
Sleep Efficiency	>85%	72%	↓
REM Sleep (%)	20–25%	15%	↓
Sleep Latency (min)	<20 min	38 min	↑

Polysomnographic evaluation confirmed substantial deviations from normal sleep patterns, with most patients exhibiting reduced total sleep time, lower REM percentage, and prolonged sleep latency. These findings were most pronounced in Parkinson's and post-stroke patients.

Table 5. Effectiveness of Interventions Tried

Intervention Type	% Reporting Improvement
Sleep hygiene education	45%
Cognitive behavioral therapy (CBT)	60%
Pharmacological treatment	55%

Cognitive behavioral therapy emerged as the most effective non-pharmacological intervention, especially in addressing insomnia driven by anxiety and maladaptive sleep behaviors. Sleep hygiene education provided modest benefits, while pharmacotherapy had varied results depending on the underlying neurological condition and medication tolerance.

Discussion The results of this study confirm that insomnia is a highly prevalent but frequently underestimated symptom among patients with neurological conditions. The interplay between disease-related neurophysiological changes, psychological distress, and pharmacological treatments collectively contributes to the development and persistence of sleep disturbances. The findings underscore the importance of individualized assessment and multidisciplinary care in managing insomnia.

Parkinson's disease patients were the most severely affected, largely due to motor symptom fluctuations, dopaminergic therapy, and coexisting depression. Epilepsy patients exhibited disrupted sleep mainly due to nocturnal seizures and sedative effects of antiepileptic drugs. In multiple sclerosis, neuropathic pain and fatigue-related psychological burden were prominent insomnia drivers. Stroke survivors struggled with sleep continuity and early awakening, often linked to anxiety, reduced mobility, and altered circadian mechanisms.

The use of polysomnography strengthened the reliability of subjective complaints and allowed a more precise characterization of sleep structure disturbances. This multimodal approach provided compelling evidence of the need for targeted insomnia management strategies that go beyond general sleep advice.

An important implication of the study is the demonstration that non-pharmacological approaches, particularly cognitive behavioral therapy, can produce significant benefits even in the context of complex neurological pathology. These findings align with existing literature on the role of CBT-I (CBT for insomnia) as a gold standard intervention, adapted here for a neurological population. The relatively

lower impact of pharmacotherapy reflects the need for careful selection of agents that do not exacerbate neurological symptoms.

Taken together, the evidence suggests that early identification and comprehensive treatment of insomnia should be integrated into routine neurological care. Addressing insomnia not only improves quality of life but may also enhance cognitive function, emotional regulation, and disease management.

Conclusion Insomnia is a prevalent, multifaceted issue in patients with neurological disorders. This study emphasizes the critical need for its identification and integrated management. By understanding the condition-specific mechanisms and responses to intervention, healthcare professionals can develop more effective treatment strategies to improve sleep quality and enhance quality of life for this vulnerable population.

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