

# Evaluation of Insomnia

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## Abstract

Insomnia is one of the commonest sleep disorders encountered in primary care as well as sleep medicine practice. In this review article, the nosology of insomnia is outlined in the light of the recently published International Classification of Sleep Disorders-3<sup>rd</sup> Edition. A standardized schema is then described as to how to approach a patient presenting with insomnia symptoms. The various tools that may be utilized in this work-up are briefly discussed.

## Introduction

Insomnia is one of the common manifestations amongst sleep disorders. It has been estimated that about a third of the population of industrialized nations have occasional episodes of insomnia and more than one out of every ten individuals report chronic difficulties that impact daytime activities.<sup>1-4</sup> Knowledge of the major manifestations of insomnia as well as strategizing methods for its assessment, thus assume prime importance. According to a questionnaire based study performed in Delhi, the prevalence of insomnia was found to be 28.15 in adults, 59% in the elderly, and 17.35 among children.<sup>22</sup> Another study from South India demonstrated a prevalence of 18.6%.<sup>23</sup>

## Definition and classification of insomnia

The American Association of Sleep Medicine (AASM) has recently published the International Classification of Sleep Disorders -3<sup>rd</sup> Edition (ICSD-3)<sup>5</sup>. The previous version (ICSD-2) identified several different types of

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insomnia. ICSD-3 consolidates these types and groups them into categories of chronic and short term insomnia. Within the chronic insomnia grouping, several characteristic types of insomnia are described. The four main categories of insomnia include the following entities.

- Chronic insomnia disorder
- Short term insomnia disorder
- Other insomnia disorders
- Isolated symptoms and normal variants.

The various types of chronic insomnia are as follows:

*Psychophysiological insomnia:* This is characterized by excessive focus on and heightened anxiety about sleep; difficulty falling asleep in bed at the desired bedtime or during planned naps, but no difficulty falling asleep during other monotonous activities when not intending to sleep; ability to sleep better away from home than at home.; mental arousal in bed characterized either by intrusive thoughts or a perceived inability to volitionally cease sleep-preventing mental activity; heightened somatic tension in bed reflected by a perceived inability to relax the body sufficiently to allow the onset of sleep.

*Paradoxical insomnia:* The patients show a consistent marked mismatch between objective findings from polysomnography or actigraphy and subjective sleep estimates derived either from self-report or a sleep diary.

Idiopathic insomnia: No identifiable precipitant or cause

Inadequate sleep hygiene

Behavioral insomnia of childhood

Insomnia due to mental disorder

Insomnia due to medical condition

Insomnia due to drug or substance

The definition of chronic insomnia includes the following parameters.

1. A complaint of difficulty initiating sleep, difficulty maintaining sleep, or waking up earlier than desired, resistance to going to bed on appropriate schedule, or difficulty sleeping without parent or caregiver intervention.
2. The sleep difficulty occurs despite adequate opportunity and circumstances for sleep.
3. At least one of the following forms of daytime impairment related to nighttime sleep difficulty is reported by the patient:
  - Fatigue or malaise.
  - Attention, concentration, or memory impairment
  - Social or vocational dysfunction or poor school performance
  - Mood disturbance or irritability.
  - Daytime sleepiness.
  - Behavioral problems (e.g. hyperactivity, impulsivity, aggression).
  - Motivation, energy, or initiative reduction
  - Proneness for errors or accidents at work or while driving.
  - Concerns about or dissatisfaction with sleep.
4. The reported sleep/wake complaints cannot be explained purely by inadequate opportunity (i.e. enough time is allotted for sleep) or inadequate circumstances (i.e. the environment is safe, dark, quiet and comfortable) for sleep.
5. The sleep disturbance and associated daytime symptoms occur *at least three times per week*.
6. The sleep disturbance and associated daytime symptoms have been present for *at least three months*.
7. The sleep/wake difficulty is not better explained by another sleep disorder.

Difficulties in initiating sleep, difficulties in maintaining sleep, or waking up too early have been reported in all age groups. However, resistance in going to bed on an appropriate schedule and difficulty sleeping without parent or caregiver intervention is seen most commonly in children and older adults who require the supervision of a caretaker due to significant level of functional impairment (e.g. those with dementia). Often, patients with chronic insomnia may show recurrent episodes of sleep/wake difficulties lasting several weeks at a time over several years, and yet not meet the three month duration criterion for any single such episode. It is prudent to assign these patients a diagnosis of chronic insomnia disorder, given the persistence of their intermittent sleep difficulties over time. Also, some patients who use hypnotic medications regularly may sleep well and not meet the criteria for an insomnia disorder when they take such medications. In the absence of such medications, however, these same patients may meet the diagnostic criteria. This diagnosis would apply to those patients particularly if they present clinically and voice concerns about their inability to sleep without their sleep medications. Several conditions such as chronic pain disorders or gastro-esophageal reflux disease may cause the sleep/wake complaints. In quite a few patients, such conditions are chronic and are not predominant cause of difficulty. In case the patient's sleep wake complaints are not independently caused by the medical condition outlined above, and the sleep wake complaints require separate treatment, then a diagnosis of chronic insomnia disorder should be made.

Chronic insomnia has been categorized into the following primary and secondary varieties.

#### Primary insomnia

- Psychophysiological insomnia
- Paradoxical insomnia
- Inadequate sleep hygiene
- Behavioral insomnia of childhood

#### Secondary insomnia

- Insomnia due to mental disorder
- Insomnia due to medical condition
- Insomnia due to drug or substance

For it to be termed as short term or adjustment insomnia, the sleep disturbance and associated daytime symptoms should be present for *less than three months*

and symptoms may be present *fewer than three times a week*. Acute stressors, grief and bereavement may be associated with sleeplessness. However, as in the case of chronic insomnia, the sleep-wake symptoms must merit independent therapeutic attention in order to be classified as short-term insomnia.

The ICSD-3 has also been designed to synchronize itself with the other two major classification schemes, namely Diagnostic and Statistical Manual of Mental Disorders, fourth edition–text revision (DSM-IV-TR and International Classification of Diseases (ICD-9-CM and ICD-10).<sup>6-8</sup>

### Basis for evaluation of insomnia

The fundamental thought behind any assessment module designed for the evaluation of insomnia is best explained by the model proposed by Spielman *et al.*<sup>9,10</sup> According to this model, there are factors that predispose an individual to develop insomnia; there others that precipitate its occurrence and still other factors that perpetuate or maintain insomnia once it has set in. This is also termed as the “*3-P Model*”. Familial history of light or disrupted sleep, hyper-arousal, and psychological characteristics such as a tendency to worry excessively and an obsession with personal well-being often serve as predisposing factors. Although capable of reducing the threshold to develop insomnia, they cannot independently cause insomnia in the absence of precipitating factors.<sup>1,11-16</sup>

Events that could trigger or precipitate insomnia include stress associated with family and work/school perspectives, chronic health problems, mood disturbances, and environmental factors.<sup>17-19</sup>

Commonly practiced behavior like napping, irregular sleep schedules, excessive caffeine intake, worry about inability to sleep and daytime consequences as a result of sleep loss, unrealistic sleep expectations can serve as perpetuating factors once insomnia has been triggered.<sup>20,21</sup>

### Approaching a patient with insomnia with self-reported questionnaires

A broad based inquiry into all potential causes of the patient’s complaints should be carried out. Even before the patient steps into the clinician’s office, a self-reported questionnaire can serve as a vital instrument. Several aspects of the patient’s sleep can thus be looked into and roughly quantified and scored. They include sleep quality,

insomnia severity, sleep-related cognitions, sleep habits, daytime sleepiness, and fatigue and mood disturbances. To cite an example, sleep related occupational impairment has been assessed using the Loughborough Occupational Impact of Sleep scale (LOISS). Respondents are required to report how often over the past four weeks the quality of their sleep has affected their performance at work. It would include the impact on punctuality, absenteeism, efficiency, job satisfaction, productivity, stamina and communication.<sup>24</sup> Some of the other commonly used instruments are Pittsburgh Sleep Quality Index (PSQI), Insomnia Severity Index (ISI), Insomnia Symptom Questionnaire, and the Athens Insomnia Scale.<sup>25,26</sup> A Hindi translation of the ISI has been recently validated.<sup>(25)</sup>

### Sleep history

A thorough sleep history and the clinical interview can lead to enlisting a comprehensive differential diagnosis and design a reasoned treatment plan. A number of structured and semi-structured interview patterns for sleep disorders and insomnia are available.<sup>16,27-29</sup> A good sleep history should focus on some principal areas.

- **Pre-sleep conditions:** This would include main activities of the patient, bedroom environment, number of persons sharing the bed, and bedtime state of body and mind.
- **Chief complaint:** This should highlight initiation, and maintenance of sleep, early morning awakening, and un-refreshing sleep.
- **Time course of complaint:** The duration, age of onset, predisposing factors, precipitating factors should be detailed.
- **Nocturnal symptoms:** Several nocturnal symptoms like awakening, snoring, leg pain can interrupt sleep.
- **Functional status during daytime:** Whether refreshed, fatigued; any cognitive malfunction, mood disturbances, quality of life issues may be elicited.
- **Daytime activities:** Frequency of napping, alcohol, coffee/tea, exercise is to be recorded.
- **Medical & psychiatric condition:** Any history of medications, chronic pain, and other medical disease should be obtained.
- **Current and past treatment history** is to be outlined.

- **Sleep incompatible thoughts, behavior and sleep hygiene** should be clearly looked into. They can act as precipitating or perpetuating factors.
- **Co-morbid illnesses** should be evaluated.
- **Family history of similar illness and psychosocial history** can serve as important pointers.
- **Report from spouse/partner** is of utmost help. These inputs can provide collateral information about the nature of the insomnia disorder, including symptom frequency, severity, and duration, and about the nature and degree of daytime impairment.

**Formulation of the case**

Having obtained a detailed sleep history and performing a meticulous clinical interview, a list of probable differential diagnostic entities should be drawn up. These initial diagnostic impressions should be discussed with the patient emphasizing that they are only working hypotheses and are subject to change. Patient inputs may be obtained. Further post-interview assessments and preliminary treatment options can also be outlined and decided upon.<sup>(1)</sup> This collaborative approach with the

patient, as the evaluation continues, generally has a vital role in the successful outcome of the therapy.

**Post-interview assessment**

Assessment of the patient after the clinical interview can encompass a host of measures. This includes examination of a well maintained sleep diary, actigraphy, polysomnography (PSG), neurobehavioral tests, and medical assessment.

**Sleep Diary**

Sleep diary is one of the most commonly used tools used in the diagnosis and monitoring of therapy of insomnia. It is a depiction of quantitative and qualitative self-evaluation of nighttime sleep and daytime behaviors that influence sleep (Figure-1). It may be recorded in various formats (visual analog, nominal and quantitative).<sup>(30,31)</sup> parameters like time in bed, total sleep time, wake after sleep onset can be deduced from sleep diary records. Sleep efficiency is defined as the ratio of total sleep time to time devoted to sleep multiplied by 100. It is obtained from sleep diary data and is commonly used economical

**Figure 1: Quantitative sleep diary**

Day & Night	Fatigue Rating	Naps: start & end times	Sleep medicines or alcohol	Time you went to bed and turned out the lights	How long it took you to fall asleep the first time	Number of times you woke up after falling asleep	How long you were awake during the night	Time you woke up this morning the last time	Time you got up for good	Total sleep time	Quality Rating 1=very poor 2=poor 3=fair 4=good 5=excellent	Restfulness rating 1=Not at all 2=Slightly 3=Somewhat 4=Rested 5=Well rested

Fatigue Rating Scale:  
0=extremely fatigued; 25=moderately fatigued; 50=mildly fatigued; 75=somewhat energetic; 100=very energetic

and objective parameter of assessing treatment strategies adopted in insomnia. Inputs regarding caffeine consumption, bedtime activities, medications taken for sleep and estimates of sleep quality can be incorporated in the sleep diary.<sup>25</sup> Recordings in a sleep diary should be made for at least two weeks duration.<sup>32,33</sup> However, when compared with PSG, sleep latency and time awake during the night are often overestimated and total sleep time underestimated by sleep diary.<sup>34,35</sup> Also there is poor correlation of sleep diary results with actigraphy.<sup>36</sup>

### Actigraphy

Wrist-watch sized motion sensors that are worn by the patient in their familiar habitat continuously are termed as actigraphs. This device measures the level of activity of the patient, which can later be correlated with sleep. Together with inputs from sleep history and sleep diary, actigraphy can help in the diagnosis and management of circadian sleep wake rhythm disorders and paradoxical insomnia.<sup>37,38</sup> Various sleep parameters like number of sleep awakenings, wake after sleep onset (WASO), TST and sleep efficiency percentage can be validated by actigraphy.<sup>25</sup> Validation of actigraphy has also been done in patients with comorbid insomnia.<sup>25</sup>

### Polysomnography

Polysomnography is not routinely indicated in the evaluation of every patient with insomnia. The indications for PSG in insomnia are depicted in the following scenarios.

- When symptoms are inconsistent, non-specific, and the patient's subjective evaluation is questionable as in sleep misperception state (paradoxical insomnia)
- If co-existent sleep-related breathing disorders or Periodic Limb Movements (PLMs) are suspected
- PSG may be considered when initial diagnosis is uncertain, resistant to treatment, precipitous arousals, and violent behavior.

Typical PSG findings in insomnia include increased sleep latency (>30 min, decreased TST, decreased sleep efficiency, increased stage N1 (%TST), decreased stage N3 (%TST), increased REM latency and decreased REM latency (depression).

### Neurobehavioral tests

Impairments in specific cognitive and behavioral domains such as vigilance and psychomotor functioning have been demonstrated in some patients with insomnia.<sup>39,40</sup> Neurobehavioral and cognitive test batteries may be utilized to measure the daytime impairment associated with insomnia in such patients.<sup>1</sup>

### Medical assessment

A thorough history and physical examination may often lead to the suspicion of a co-existing medical condition. Appropriate investigations can then be conducted to establish the diagnosis (e.g. iron deficiency anemia, prostate disorders, menopause, diseases of thyroid etc).

### Conclusion

The differential diagnosis in any case of insomnia would include medical conditions, medication/substance use, and psychiatric conditions, other sleep disorders (insufficient sleep, circadian rhythm sleep wake disorders, restless leg syndrome, periodic limb movement disorder, and sleep disordered breathing). A thorough, comprehensive and systematic evaluation can help in identifying the core condition among the heterogeneous and complex sleep disorder like insomnia. A large proportion of insomnia patients attend the primary care services.<sup>(41)</sup> A brief, inexpensive and algorithmic approach to evaluation of insomnia would go a long way in the successful management of this disorder.

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