

# Insomnia: An Update on Epidemiology, Diagnosis and Non-pharmacological Management

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## ABSTRACT

Insomnia is defined as a condition in which a person finds it difficult to fall or stay asleep. It is usually associated with significant impairment in daytime function and adversely affects the quality of life of the individual. Insomnia is often found in individuals with psychiatric illness and it has been reported that insomnia may be a risk factor for hypertension, diabetes, depression, anxiety, substance use disorders, and suicidal tendencies. As insomnia is associated with poor quality of life, increased rates of road traffic accidents, and adverse health consequences, early detection and treatment of this condition is warranted. It is recommended that treatment be targeted specifically to address insomnia whenever it is present, including when it occurs along with physical or psychiatric conditions. Several treatment options are available for Insomnia. This paper reviews the various studies on insomnia with special emphasis on diagnosis and various non-pharmacological treatments like cognitive behavior therapy in insomnia (CBT-I).

**Keywords:** Adolescents, Cognitive behavior therapy in insomnia-I, Functional outcomes of sleep, Insomnia, Insufficient sleep, Sleep medicine, Sleep quality.

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## INTRODUCTION

Insomnia is defined as a condition in which a person finds it difficult to fall or stay asleep.<sup>1,2</sup> It is found to have a significant impact on daytime functioning and quality of life of the individual.<sup>3-5</sup> Insomnia is often found in individuals with psychiatric illness and it has been reported that individuals with insomnia are more prone to conditions such as diabetes, hypertension, cardiac illnesses, anxiety, mood disorders, depression and suicidal tendencies.<sup>6-13</sup> As insomnia is associated with impairment in quality of life, adverse health consequences, increased rates of road traffic accidents along with multiple life-threatening complications, early detection and treatment of this condition is warranted.<sup>14-19</sup> All these factors make insomnia an important pathology that should be diagnosed appropriately and treated accordingly.<sup>20,21</sup>

Several treatment options are available for Insomnia. This paper reviews the various studies on insomnia with special emphasis on diagnosis and various non-pharmacological treatments like cognitive behavior therapy in insomnia (CBT-I).

### How to Diagnose Insomnia?

The first step in the diagnosis of insomnia is to take a proper clinical history of the patient with regards to whether he has difficulty in sleep initiation (falling asleep), difficulty in maintaining sleep (staying asleep), early morning awakening resulting in daytime dysfunction.<sup>1,2</sup>

The daytime dysfunctions that are commonly seen include fatigue, mood disturbance, irritability, excessive daytime sleepiness, malaise; attention deficits, poor cognition, decreased performance at the workplace, and a lingering dissatisfaction regarding the quality of sleep.<sup>1</sup>

The sleep disturbance should occur in an environment where there is an adequate opportunity to initiate and maintain sleep. Symptoms must be present at least three days per week for at least three months according to DSM-5 and ICD-3 classifications.

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Short-term insomnia/episodic insomnia is a condition where similar symptoms are present for less than 3 months.<sup>22,23</sup> To diagnose a patient with insomnia his current symptoms should not be attributed to any other physical, metabolic, psychiatric, or sleep disorder (Tables 1 and 2).

Short sleep-related insomnia-meets criteria for chronic insomnia and sleeps less than 6 hours per night on average. They have poor prognoses and have a high risk for the development of hypertension, type 2 diabetes, and cognitive dysfunction.<sup>23,24</sup> Studies are currently underway to reclassify this as a spate entity in insomnia classification.

## EPIDEMIOLOGY OF INSOMNIA

Although more than 30% of patients complain about insomnia symptoms, it is a relatively underdiagnosed condition with only 15% of the patient being clinically diagnosed.<sup>24-27</sup>

Nocturnal complaints are common, especially sleep initiation and sleep maintenance.<sup>28</sup> In about 70% of patients, it is a persistent condition, especially in women and elderly. The male-to-female

**Table 1:** Tabular form of classification

*ICSD and the DSM old classification of insomnia.*<sup>22,23</sup>

1. Psycho physiologic insomnia
2. Paradoxical insomnia
3. Childhood behavioral insomnia
4. Substance/drug abuse linked insomnia
5. Insomnia associated with a mental disorder
6. Insomnia associated with other medical conditions
7. Idiopathic insomnia

Source: Edinger JD, Wyatt JK, Stepanski EJ, et al. Testing the reliability and validity of DSM-IV-TR and ICSD-2 insomnia diagnoses. Arch Gen Psychiatry 2011;68:992–1002.

**Table 2:** Current classification of insomnia<sup>22,23</sup>

Chronic insomnia  
Persistent insomnia disorder

Source: Edinger JD, Wyatt JK, Stepanski EJ et al. Testing the reliability and validity of DSM-IV-TR and ICSD-2 insomnia diagnoses. Arch Gen Psychiatry 2011;68:992–1002.

ratio is skewed towards the female gender and family history is reported in approximately 37% of individuals.<sup>29,30</sup>

As described earlier insomnia is associated with high rates of divorce, marital disputes, poor work performances, depression, post-traumatic stress disorder, anxiety, and lingering thoughts regarding the poor quality of sleep.<sup>31–34</sup>

## SYMPTOMS OF INSOMNIA

The most common presenting complaint is difficulty in initiating and maintaining sleep in a conducive environment. The symptoms should be present for most days for at least 3 months. The symptoms may be co-existent with other sleep disorders. The symptoms may usually be triggered by various factors including socio-economic and cultural factors.<sup>35,36</sup>

### Sleep History—What is the Importance in Insomnia?

A sleep history should include the following:<sup>37–41</sup>

- Daily sleep time and wake time.
- Bedtime behaviors/bedtime routine and nocturnal behaviors.
- Daytime dysfunction.

#### Sleep and Wake Time

This should include:

- When does the patient go to bed?
- Approximate time he takes to fall asleep?
- Whether sleep is associated with any nocturnal awakenings?
- If awakening occurs, how much time is required to go back to sleep?
- Waking up and out of bedtime.

Proper history should be obtained as to what the patient does if he doesn't fall asleep to rule out any positive reinforcements for staying awake. History of any afternoon or evening nap should also be obtained as these naps may deter the patient from falling asleep at night.<sup>42,43</sup>

### Bedtime Routine and Nocturnal Behaviors

Proper and healthy conditions are needed for sleep. Someone with true insomnia may not be effectively treated by simply providing a dark, quiet environment. The clinician through proper history taking must ensure that poor sleep is not due to poor sleep conditions and other environmental factors.

Detailing the bedtime routine may also highlight areas for intervention during the treatment phase. For example, laptop, television viewing during bedtime, and use of mobile phones and other related devices are associated with shorter sleep duration.<sup>43,44</sup>

Another important factor is to rule out nocturnal symptoms like apnea, leg kicking, etc.<sup>43,44</sup>

### Daytime Dysfunction and Decreased Productivity

Daytime dysfunction which includes poor quality of life, fatigue, and cognitive disturbances, etc., is a key factor in diagnosing insomnia.

### Spielman—Behavioral Model of Insomnia

The 3P model, developed by Spielman clearly describes the science behind insomnia, and the various factors that trigger insomnia and lead to the persistence of insomnia.<sup>40</sup> This is a behavioral model which helps in the diagnosis of insomnia.

The 3P Model occurs in sequential order and includes: (1) Predisposing factors—which increase the propensity to insomnia, (2) Precipitating factors—which may be causative factors of insomnia, (3) Perpetuating factors—which make the insomnia persist for a long time.

Predisposing factors are usually the genetic and personal traits that result in insomnia.<sup>40–42</sup> Precipitating factors can be multi-dimensional factors that can trigger insomnia. These may be personal events or events at workplace. Perpetuating factors are factors due to which insomnia persists even after the initial trigger is removed.

### Medications

Clear medication history should be taken to rule out drugs interacting with circadian rhythms. The drugs that can affect your sleep-wake cycle usually includes:

- Selective serotonin reuptake inhibitors (SSRIs).
- Serotonin norepinephrine reuptake inhibitors (SNRIs).
- Monoamine oxidase inhibitors (MAOIs).
- Sedative hypnotics.
- Other medications anti-hypertensive, beta blockers.<sup>4,45–47</sup>

## DIAGNOSIS OF INSOMNIA

### Insomnia Assessment Methods

- Sleep Diary – Essential Tool in Insomnia Diagnosis: It is a form compiled by the patient, in which details of bedtime, time to sleep, wake-up time, out-of-bed time, and adverse events during sleep are noted. It should ideally be recorded for a continuous 2 weeks and then reviewed.
- Actigraphy – Highly Reliable Tool: Actigraphy is a wrist-worn device, that records movement, and creates an algorithm to generate sleep. It is reported to be as reliable as polysomnography.<sup>48–53</sup> The newer actigraphy devices are equipped with a light sensor which provides an estimate of sleep latency.

It is also useful in ruling out circadian rhythm disorders.

- Self-monitoring Devices: These devices usually help to differentiate between light sleep and deep sleep. However there aren't enough studies or data to support the usage of such devices. Their usage is hence not recommended for diagnosis of insomnia.<sup>53,54</sup>
- Polysomnography: Although not directly linked to insomnia polysomnography can be used to rule out other sleep-related disorders.<sup>55</sup>
- Questionnaires
  - Epworth sleepiness scale.<sup>56</sup>
  - The insomnia severity index-commonly used as a research tool.<sup>57</sup>
  - The dysfunctional beliefs and attitudes about sleep.<sup>58</sup>
  - The Pittsburgh sleep quality index.<sup>59</sup>

## MANAGEMENT OF INSOMNIA

Treatment of insomnia can be both pharmacological and non-pharmacological. In this article we will be discussing in depth the various non-pharmacological treatment options for insomnia with special emphasis on CBT-I.

## NON-PHARMACOLOGICAL TREATMENT

The most widely accepted non-pharmacological management is CBT-I.

In studies done in different parts of the world, CBT-I has been found to reduce insomnia and also improve sleep quality. As a result of positive results, the American College of Chest Physicians has recommended it to be the first line of treatment for insomnia.<sup>60–69</sup>

Cognitive behavior therapy-I has been found to be superior to medical management in obtaining long-term results.<sup>70</sup> The ideal duration is around 4–6 cycles but however, there has been evidence suggesting tremendous response even with four cycles of CBT.<sup>61,71</sup>

Here we review the different components of CBT.

## BEHAVIORAL COMPONENT

- Stimulus Control—The Starting Point of CBT-I: Conditioned arousal has been implicated as a cornerstone in the treatment of insomnia. The subjects are advised to get up from their bed if they are not feeling sleepy. Similarly they are also asked to refrain from doing any other activities in bed. They are also educated to use the bed only for sleeping and sexual activities.

Subjects are also advised to maintain a fixed waking up time and also to remove themselves from bed within 15 minutes of waking up.<sup>72,73</sup>

- Sleep Restriction: In the continuum of stimulus control, sleep restriction is the next step. The basic principle here is to reduce the amount of time spent in bed. Sleep diaries are very useful in designing the desired times. Although this may be in conflict with the fact that the person isn't given enough time/environment to sleep, it helps to prevent sleep fragmentation and unwanted stimulus control effects.<sup>73–76</sup>

As there are concerns with regard to adverse consequences of sleep restriction (e.g., cognitive deficits, drowsy driving), a minimum time in bed of 5–6 hours has been used in the literature.<sup>72</sup> In addition, sleep restriction may exacerbate co-morbidities.

- Relaxation and Paradoxical Intention: Relaxation techniques vary from person to person, some of the most commonly used

techniques include diaphragmatic breathing, visual imagery, contracting, and relaxing various groups of muscles.<sup>73–76</sup>

## Cognitive Components of CBT-I

Maladaptive beliefs and thoughts about sleep are typically addressed throughout treatment.

An important technique that has been implicated in countering catastrophic thoughts taking cues from patient's experiences through proper interviews. This is a kind of positive re-enforcement. For example, if a patient believes that a poor night's sleep will make him unproductive and a liability at the workplace, the psychologist can lend a helping hand by making the patient productive at the workplace despite a poor overnight sleep.

Constructive worry exercise is a technique where in the patients are asked to describe three or more problems that might keep them awake at night thereby resulting insomnia. The clinician provides a solution for each problem described. The exercise is folded and put away and if the patient is unable to initiate sleep, they are asked to remind themselves that they already have taken appropriate steps for the problem resolution- "problem-solving best" (i.e., not in the middle of the night).<sup>70–73</sup>

## Evidence of Efficacy of CBT-I

Several meta-analytic reviews have compared the efficiency of CBT-I to pharmacological treatment and also with placebo.<sup>72–78</sup> In one of the landmark meta-analyses on CBT-I, van Straten et al.<sup>61</sup> pooled data from 87 randomized controlled studies that used at least one component of CBT-I, which included 3,724 patients and 2,579 non-treated controls. The strongest effects were improvements in insomnia symptoms, as measured using the insomnia severity index (Hedges'  $g = 0.98$ ), sleep efficiency ( $g = 0.71$ ), and a relatively small effect was observed for changes in total sleep time ( $g = 0.16$ ).

Further, data suggest that CBT-I is an effective tool in managing insomnia in patients with co-morbidities, psychiatric and behavioral disorders.<sup>62,15,16</sup>

In all the above studies CBT was delivered through face-to-face sessions and also through virtual sessions. Virtual sessions were more useful predominantly because of patient comfort, but however, some studies were of the opinion that face-to-face sessions are necessary for monitoring progress and supervision.<sup>77–79</sup>

## CONCLUSION

Insomnia is an often-underdiagnosed disorder seen in this gadget-savvy and competitive world of today. As discussed in this review, early diagnosis of the condition can be done using questionnaires and low-cost non-invasive techniques. Eliciting a proper clinical history is the cornerstone in diagnosis of management. Once insomnia is diagnosed it can be managed both pharmacologically and non-pharmacologically although American Association of Physicians Describes CBT-I as the chief intervention in the management of insomnia.

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