

## Non-Pharmacological Management of Insomnia

Umesh Kumar Vyas

### Abstract

Insomnia is the most frequent sleep disorder. It is a symptom, and is defined as “chronic inability to obtain the amount of sleep needed for optimal functioning and well-being”. Untreated insomnia is associated with significant morbidity and mortality. Thorough assessment of insomnia is essential in choosing the most appropriate strategy for management. If a cause of insomnia is identified, initial treatment should be directed at specific factor. Since insomnia is a chronic condition, long-term and safe treatments are warranted. Non-pharmacologic options have been available for decades, but lack of physician awareness and training, difficulty in obtaining reimbursements and questions about efficacy have limited their use. These therapies offer the greatest potential for long term gains in preventing recurrence of insomnia. Pharmacological options are most useful for acute insomnia. They are commonly used but long term use of hypnotics can become complicated by drug tolerance, dependence or rebound insomnia. Non-pharmacological interventions produce reliable and durable clinical benefits in the treatment of primary insomnia, insomnia associated with medical or psychiatric conditions and insomnia in elders. Additional research is still needed to develop and validate treatment algorithms that would optimize outcomes and reduce morbidity. Author concludes that non-pharmacological therapies should always be a component in management of Insomnia.

**Method:** Pubmed.gov was searched by using pre-determined key word.

**Objectives:** To provide an update of the evidence regarding the efficacy, effectiveness, durability and generalizability of psychological and behavioural interventions for persistent insomnia.

**Keywords:** Insomnia

### Introduction:

Insomnia is chronic inability to obtain the amount of sleep needed for optimal functioning and well-being. Insomnia has received much attention in last few decades, since it has become a growing and complex problem in our society.<sup>1</sup> Insomnia is defined as the chronic complaint of difficulty initiating or maintaining sleep, early awakening, and interrupting or non-restorative sleep. Furthermore, it must be accompanied by clinically significant impairment in day time function, for which there is no identifiable cause such as another sleep, psychiatric or medical disorder.<sup>1</sup>

### General Criteria for Insomnia:<sup>2</sup>

1. A complaint of difficulty initiating sleep, difficulty maintaining sleep, or waking up too early or sleep that is non-restorative or poor in quality. In children, the sleep difficulty is often reported by the caretaker and may consist of observed bedtime resistance or inability to sleep inadequately.
2. The above sleep difficulty occurs despite adequate opportunity and circumstances for sleep.
3. At least one of the following forms of daytime impairment related to the night-time 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
- Motivation, energy or initiative reduction
- Proneness for errors, or accidents at work or while driving
- Tension, headaches or GI symptoms in response to sleep loss
- Concerns or worries about sleep

Insomnia is prevalent condition in both the general population and in clinical practice, and it is associated with significant morbidity and mortality. It may present as the primary complaint or in association with physical or mental health problem.

### Classification:

Insomnia can be classified into two main etiologic groups:

- Primary Insomnia: When identifiable etiologies for insomnia have been ruled out, a diagnosis of primary insomnia can be made.
- Secondary Insomnia: Related to other medical disorders, mental disorders or related to known organic factors.

Insomnia can be divided in to three types based on duration:

- Less than one month called Acute or Transient insomnia.
- One to six months called Sub-acute or Short-term insomnia.
- More than six months called Chronic insomnia.

Following types of Insomnia recognized in The International Classification of Sleep Disorders (ICSD) second edition, Diagnostic and Coding manual:<sup>2</sup>

- Adjustment Insomnia (Acute Insomnia)
- Psycho-physiological Insomnia
- Paradoxical Insomnia
- Idiopathic Insomnia
- Insomnia Due to Mental Disorder
- Inadequate Sleep Hygiene
- Behavioural Insomnia of Childhood
- Insomnia Due to Drug or Substance
- Insomnia Due to Medical Condition
- Insomnia Not Due to Substance or Known Physiological Condition, Unspecified (Nonorganic Insomnia, NOS)
- Physiological (Organic) Insomnia, Unspecified

**Prevalence:**

One third of adult population reports insomnia, 9 to 12% experience day time consequences and approximately 6% meet formal criteria for an insomnia diagnosis.<sup>3</sup> Insomnia is more common among women, middle-aged and increases with age, shift workers and with medical or psychiatric disorders.

**Consequences:**

Persistent insomnia can produce an important burden for individual and society, as evidenced by reduced quality of life, impaired daytime functioning and increased absenteeism at work, and higher health-care cost. Persistent insomnia is also associated with increased risks of depression and chronic use of hypnotics.

Diagnosis of insomnia is based on subjective complaint of difficulties falling or staying asleep or non-restorative sleep that is associated with marked distress or significant daytime impairments. Several indicators such as intensity, frequency and duration, needs to be evaluated to assess severity of insomnia.

**Evaluation:**

Insomnia is an important public-health problem that requires accurate diagnosis and effective treatment (Standard).<sup>4</sup> Insomnia is a symptom of an underlying disorder or condition. The insomnia may be a problem directly related to the sleep-wake regulatory system and/or it might be associated with a comorbid psychiatric, behavioural, medical, or neurological condition.<sup>4</sup> Insomnia is primarily diagnosed by clinical evaluation through a careful, detailed medical, psychiatric, and thorough sleep history (which includes assessment of sleep patterns and waking processes) (Standard).<sup>4</sup>

**Treatment options:**

Pharmacotherapy is currently the most common treatment modality for insomnia,<sup>5</sup> but long-term use of hypnotics in chronic insomnia can become complicated by drug tolerance, dependence or rebound insomnia. Since insomnia is a chronic condition, long-term and safe treatments are warranted. Non-pharmacological options provide longer lasting benefits.

If a cause of insomnia is identified, initial treatment should be directed at the specific factor. If insomnia persists, non-pharmacologic and/or pharmacologic interventions should be instituted. Hypnotic agents are the treatment of choice for the management of acute or transient insomnia. The expected goal is to normalize the sleep pattern within a few days to weeks. Behavioural interventions are important aspect of the treatment of chronic primary insomnia.

Classification of evidence (Table 1) is used to determine different level of recommendations (Table 2), which is available for behavioural therapies in management of insomnia.

<b>Table 1: AASM (American Academy of Sleep Medicine) Classification of Evidence (Based on Sackett system,<sup>6</sup> the criteria for grading evidence level of each study)</b>	
Randomized well-designed trials with low alpha and beta error (Grade I)	Randomized trials with high alpha and beta error (Grade II)
Non-randomized concurrently controlled studies (Grade III)	Non-randomized historically controlled studies (Grade IV)
Case series (Grade V)	
(Alpha (Type I error) refers to the probability that the null hypothesis is rejected when in fact it is true (generally acceptable at 5% or less, or $p < 0.05$ ). Beta (Type II error) refers to the probability that the null hypothesis is mistakenly accepted when in fact it is false (generally trials accept a beta error of 0.20). The estimation of Type II error is generally the result of a power analysis. The power analysis takes into account the variability and the effect size to determine if sample size is adequate to find a difference in means when it is present (Power generally acceptable at 80-90%).	

<b>Table 2: AASM Levels of Recommendations (The following are recommendations of the SPC (Standards of Practice Committee) approved by the Board of Directors of the AASM).<sup>7</sup></b>	
Term	Definition
Standard	This is a generally accepted patient-care strategy, which reflects a high degree of clinical certainty. The term standard generally implies the use of Level I evidence, which directly addresses the clinical issue, or overwhelming Level II evidence.
Guideline	This is a patient-care strategy, which reflects a moderate degree of clinical certainty. The term guideline implies the use of Level II evidence or a consensus of Level III evidence.
Option	This is patient-care strategy, which reflects uncertain clinical use. The term option implies either inconclusive or conflicting evidence or conflicting expert opinion.

Recommendations according to type of Insomnia:<sup>10, 11, 12</sup>

For both, chronic primary insomnia and secondary insomnia, the standard psychological and behavioural interventions are effective and recommended.

Recommendations for specific therapies:

#### 1. Stimulus control therapy

Effective and recommended therapy in treatment of chronic insomnia (Standard)

Objective is to train the insomnia patient by a set of instructions designed to re-associate the bed and bedroom with sleep and to re-establish a consistent sleep-wake schedule:

- Go to bed only when sleepy;
- Get out of bed when unable to sleep;
- Use the bed/bedroom for sleep only (no reading, watching TV etc.);
- Arise at the same time every morning;
- No napping.

#### 2. Relaxation training

Effective and recommended therapy in treatment of chronic insomnia (Standard)

Aimed at reducing somatic tension (e.g. progressive muscle relaxation, autogenic training) or intrusive thoughts at bed time (e.g. imagery training, meditation) that interfere with sleep.

#### 3. Cognitive Behavioural Therapy (CBT) with or without relaxation therapy

Effective and recommended therapy in treatment of chronic insomnia (Standard)

CBT includes various combinations of both cognitive as well as behavioural interventions. The cognitive component is aimed at changing patient's beliefs and attitudes about insomnia. The behavioural component may include therapies such as stimulus control therapy, sleep restriction or relaxation training. Sleep hygiene education is often also included.

#### 4. Sleep Restriction

Effective and recommended therapy in chronic insomnia (Guideline)

It involves curtailing the amount of time in bed to actual amount of time spent asleep. For example, if a patient reports sleeping an average of 6 hours per night, out of 8 hours spend in bed, the initial recommended sleep window (from lights out to final arising time) would restrict to 6 hours. Periodic adjustments to this sleep window are made contingent upon sleep efficiency, until optimal sleep duration is reached.

Therapy creating mild sleep deprivation, and then lengthening sleep time as sleep efficiency improves.

#### 5. Multi-component therapy (without Cognitive therapy)

Effective and recommended therapy in treatment of chronic insomnia (Guideline)

- Combining stimulus control therapy, relaxation training, sleep hygiene education
- Combining stimulus control therapy, sleep restriction therapy, sleep hygiene education
- Combining sleep restriction therapy, stimulus control therapy

#### 6. Paradoxical intention

Effective and recommended therapy in treatment of chronic insomnia (Guideline)

It involves instructing the patient to remain passively awake and avoid any effort (i.e. intention) to fall asleep. The goal is to eliminate performance anxiety, as it may inhibit sleep onset. This parameter is limited to sleep initiation insomnia.

#### 7. Biofeedback

Effective and recommended therapy in treatment of chronic insomnia (Guideline)

It provides visual or auditory feedback to patients to help them control some physiological parameters (e.g. muscle tension) in order to seek reduction in somatic arousal.

EEG Neurofeedback training: It is a self-regulation method that makes use of learning theory, more specifically, the paradigm of operant conditioning.<sup>8</sup> While the EEG is measured; the patient receives instant feedback (visual and/or auditory) on the cortical activity of the brain. The goal of this treatment modality is to normalize the functioning of the brain by inhibiting and/or reinforcing specific frequency bands.

#### **Recommendations relevant to specific patient groups:**

Psychological and behavioural interventions are effective and recommended in treatment of insomnia in older adults (Standard) and among chronic hypnotic users (Standard)

#### **Other mode of therapies:**

Sleep Hygiene Education, Imagery training, Cognitive therapy.

Insufficient evidence is available for sleep hygiene education, imagery therapy, and cognitive therapy to be an option as a single therapy. (No recommendation level)

Sleep Hygiene Education: Please see table 3

Table 3: Sleep Hygiene Education:

1. Attempt to maintain a regular sleep-wake cycle
2. Obtain morning light exposure
3. Use the bedroom only for sleep and intimacy
4. Create a comfortable, quiet, dark and temperature-controlled bedroom environment
5. Develop a relaxing routine within an hour before bedtime
6. Exercise regularly, but not within a few hours of bed time
7. Avoid use of alcohol and other addicting substances
8. Avoid caffeine or nicotine, especially within a few hours of bedtime
9. Avoid empty stomach or heavy meals before bed time, a light snack may be of value
10. Avoid daytime napping, or if napping, be aware of the impact that napping has on nighttime sleep
11. Avoid disturbances at bedtime (e.g. disruptive noises, pets, family)
12. Avoid work, computers and emotional stress in the bedroom
13. Avoid keeping a clock close to the bed to prevent "clock watching"
14. Avoid excessive wakeful time in bed (>20 minutes)

**Imagery therapy:** It involves a visualization technique to focus on some pleasant or neutral images to block out unwanted thoughts before sleep.

**Cognitive therapy:** Psychological methods aimed at challenging and changing misconceptions about sleep and faulty beliefs and attitudes about insomnia and its perceived daytime consequences.

#### Limitations of non-pharmacological management:

- Gains in sleep onset or total sleep time are not immediately attained.
- Patient motivation and encouragement are required for success of management.
- Non-pharmacological interventions are more expensive and time-consuming.
- They require the availability of a skilled therapist.

#### Results:

Psychological and behavioural therapies produce reliable changes in several sleep parameters of individuals with either primary insomnia or insomnia associated with medical and psychiatric disorders.<sup>10</sup> A Meta-analysis indicates that in patients with primary insomnia, behavioural interventions produce improvements in sleep parameters (sleep onset latency, time awake after sleep onset (WASO), number of awakenings and total sleep time) in about 70 to 80% of patients.<sup>9</sup> Behavioural interventions are more expensive, time-consuming and require the availability of a skilled therapist, but the benefits are long lasting.<sup>13</sup>

#### Clinical Pearl:

- Pharmacotherapy is currently the most common treatment modality for insomnia,<sup>5</sup> but long-term use of hypnotics in chronic insomnia can become complicated by drug tolerance, dependence or rebound insomnia.
- Psychological and behavioural therapies produce reliable changes in several sleep parameters of individuals with either primary insomnia or insomnia associated with medical and psychiatric disorders.
- Behavioural interventions are important aspect of the treatment of chronic primary insomnia; they should be used in every patient of Insomnia.

#### Competing Interests

None disclosed

#### Author Details

UMESH KUMAR VYAS, MD, FAASM, Regional Medical Director of Department of Behaviour Health, Chair of Department of Psychiatry and Psychology, Regional Medical Director of Sleep Disorders Centre, Mayo Clinic Health System, Mankato, MN, USA; Adjunct Clinical Assistant Professor, Department of Family Medicine and Community Health, University of Minnesota, Minneapolis, MN, USA; Adjunct Assistant Professor of Psychiatry and Sleep Medicine, College of Osteopathic Medicine, Des Moines University, Des Moines, IA, USA.

CORRESPONDENCE: UMESH KUMAR VYAS, MD, FAASM, Regional Medical Director of Department of Behaviour Health, Chair of Department of Psychiatry and Psychology, Regional Medical Director of Sleep Disorders Centre, Mayo Clinic Health System, Mankato, MN, USA.

Email: Vyas.Umesh@mayo.edu

#### REFERENCES

1. Diagnostic and Statistical Manual of mental disorders, text revision. 4<sup>th</sup> edition, Washington, DC: American Psychiatric Association (APA); 2000.
2. The International Classification of Sleep Disorders (ICSD) - 2, Second edition, Diagnostic and Coding Manual. American Academy of Sleep Medicine (AASM); 2005
3. Ohayon M. Epidemiology of insomnia: what we know and what we still need to learn. *Sleep Med rev* 2002; 6:97-111.
4. Littner Michael, Hirshkowitz Max, Kramer Milton et al. Practice Parameters for using Polysomnography to Evaluate Insomnia: An Update. *SLEEP* 2003; 26(6):754-760
5. Kupfer DJ, Reynolds CF. Management of insomnia. *N Engl J Med*. 1997; 336:341-6.
6. Sackett D. Rules of evidence and clinical recommendation. *Can J Cardiol* 1993; 9:487-9
7. Eddy D, ed. A manual for assessing health practices and designing practice policies: the explicit approach. Philadelphia, PA: American College of Physicians, 1992
8. Othmer S, Othmer SF, Kaiser DA. EEG biofeedback: an emerging model for its global efficacy. In: Evans JR, Abarbanel A, editors. Introduction to quantitative EEG and neurofeedback. San Diego: Academic press; 1999. p. 3-27.
9. Morin CM, Culbert JP, Schwartz MS. Non-pharmacological interventions for insomnia: a meta-analysis of treatment efficacy. *Am J Psychiatry*. 1994; 151:1172-80.
10. Morin CM, Bootzin RR, Buysse DJ et al. Psychological and behavioural treatment of insomnia: update of the recent evidence (1998-2004) *Sleep* 2006; 29(11):1398-1414.
11. Morgenthaler T, Kramer M, Alessi C et al. Practice parameters for the psychological and behavioural treatment of insomnia: an update. An American Academy of Sleep Medicine report *SLEEP* 2006; 29(11):1415-1419.

12. Chesson AL Jr., Anderson WM, Littner M, et al. Practice parameters for the non-pharmacologic treatment of chronic insomnia. *SLEEP*, vol 22, 8, 1999:1128-1133.
  13. Hauri PJ. Insomnia. *Clin Chest Med*. 1998; 19:157-68.
-