

Insomnia and its management

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Abstract

Insomnia is a perceived disturbance in the quality or quantity of sleep, which, depending on the specific condition may be associated with disturbances in objectively measured sleep. Insomnia is a common subjective complaint of inadequate sleep that affects 15% to 40% of the general population, with 10% to 15% of individuals reporting chronic insomnia of 6 month's duration.

Keyword: Insomnia

Introduction

Sleep accounts for one third of human life¹ and studies have suggested that poor sleep contributes to ill health. Epidemiologic studies reveal that abnormal sleep patterns predict lower life expectancy,² and that insomnia frequently co-occurs with affective disorders, substance abuse, other physical and psychological comorbidities.^{3,4} Thus insomnia has become a major health-care concern over recent years because of the implications and also being a risk factors for conditions such as diabetes, hypertension and development of psychiatric disorders such as depression, anxiety and suicide.^{5,6} Like other common sleep disorders^{7,8}, insomnia with short sleep duration is also known to be associated with increased odds of diabetes⁹ and also increased risk of hypertension¹⁰.

There is compelling evidence that insomnia is under recognized, under diagnosed, and under treated. A longitudinal study found that practitioners in general practice settings were unaware that patients had difficulty

sleeping in more than 50% reported cases of insomnia. The inadequate identification and treatment of insomnia has significant medical and public health implications. Chronic insomnia results in impaired occupational performance and diminished quality of life, as well as higher health-care usage and costs. Employers spend more than \$3,200 more in health cost on those with insomnia than on those who sleep like a log, researchers said. (Associated Professional Sleep Societies Meeting ;June, 2007). No such data is available from our country.

As awareness of insomnia by the public continues to increase, it is important that the clinician who sees patients with sleep/wake complaints is adept in the identification, evaluation, and treatment of insomnia.¹¹ The present article aims to provide information on the causes of insomnia, how to evaluate a patient with insomnia and the management of these patients appropriately.

Definition

Insomnia is defined as repeated difficulty with sleep initiation, duration or quality that occurs despite adequate time and opportunity for sleep with daytime complaints of sleepiness, fatigue, disturbed mood, irritability, tension headaches, gastro-intestinal (GI) complaints, worry about sleep, Generalized malaise, cognitive impairment and social/vocational dysfunction, are also common in these patients.

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Prevalence

Insomnia is a common subjective complaint of inadequate sleep that affects 15% to 40% of the general population, with 10% to 15% of individuals reporting chronic insomnia of more than 6 month’s duration. Women have 1.5 times higher risk of insomnia than men (p<0.05), and the overall prevalence of insomnia increases with age. The prevalence of insomnia has been estimated at 25% in individuals aged 65 to 79 years, compared with 14% of those aged 18 to 34 years.¹²

Classification

A variety of approaches have been used to classify insomnia on the basis of features such as symptoms, frequency, duration, severity, and presumed etiology.¹³ More recent clinical definitions, such as the Research Diagnostic Criteria (RDC) for insomnia have been established by the American Academy of Sleep Medicine. The RDC is consistent with the diagnostic categories for insomnia in both the international Classification of sleep Disorders, second edition (ICSD-2) and the clinical modification of the International Classification of Diseases, 10th edition (ICD-10) (see Table 1)

Frequency, duration, and severity criteria vary considerably across different nosologies and also have limited diagnostic utility, although they may aid in identifying patients in need of treatment and/or in following up treatment response. Duration of insomnia is probably the best indicator. Insomnias are generally classified as short –term (acute or transient)- lasting days to weeks, and chronic- lasting weeks to months. Short-term insomnia are usually due to psychological stressors (e.g., stressful life events, pain, and travel), whereas chronic insomnia is frequently associated with a variety of co morbid conditions, as well as behavioral factors that may perpetuate the insomnia. The definition of chronic ranges from duration of 2 weeks to several months, depending upon the nosology used.¹⁴

Insomnia can also be classified on the basis of etiology into primary and secondary subtypes .(See table 2) The term primary indicates that the insomnia is not caused by any known physical or mental condition, but is characterized by a consistent set of symptoms, a defined disease course, and a general responsiveness to treatment. Whereas secondary insomnia is based on the presumption that the insomnia is caused by another

Table1: Research diagnostic criteria for insomnia disorder

1. The individual reports one or more of the following sleep-related complaints: <ul style="list-style-type: none"> a. Difficulty in initiating sleep b. Difficulty in maintaining sleep. c. Waking up too early. d. Sleep that is chronically non restorative or poor in quality.
2. The sleep difficulty mentioned in the preceding text occurs despite adequate opportunity and circumstances for sleep.
3. At least one of the following forms of daytime impairment related to the nighttime sleep difficulty is reported by the individual: <ul style="list-style-type: none"> a. Fatigue/malaise b. Attention, concentration, or memory impairment. c. Social/vocational dysfunction or poor school performance. d. Mood disturbance/irritability. e. Daytime sleepiness. f. Motivation/energy /initiative reduction. g. Proneness to errors/accidents at work or while driving. h. Tension headaches and /or GI symptoms in response to sleep loss. i. Concerns or worries about sleep.

International Classification of Sleep Disorders, second edition (ICSD-2) and the clinical modification of the International Classification of Diseases, 10th edition (ICD- 10-CM)

Table 2: ICSD-2 Insomnia Classification

307.41	Adjustment insomnia
307.42	Psychophysiologic insomnia
307.42	Paradoxical insomnia
307.42	Idiopathic insomnia
327.02	Insomnia caused by a mental disorder
V69.4	Inadequate sleep hygiene
V69.5	Behavioral insomnia of childhood
291.82	Insomnia caused by drug or substance (alcohol)
292.85	Insomnia caused by drug or substance (other)
327.01	Insomnia caused by a medical condition
327.00	Physiologic insomnia, unspecified
780.52	Insomnia not caused by substance or known physiologic condition, unspecified.

International Classification of Sleep Disorders, second edition (ICSD-2)

disorder. Many medications (see table 3), as well as a large number of psychiatric, medical, and sleep disorders, can cause or exacerbate insomnia.¹⁵

Table 3: Medications associated with insomnia

Antidepressants	Decongestants
SSRIs (e.g., fluoxetine, sertraline, citalopram and paroxetine)	Phenylephrine, pseudophedrine
SNRIs (e.g., venlafaxine and duloxetine)	Hormones
Bupropion	Steroids, thyroid hormones
Antihypertensives	Respiratory agents
a- Blockers, b - Blockers	Albuterol, theophylline
Chemotherapy	Stimulants
Diuretics	Amphetamone, caffeine, methylphenidate, modafinil

SSRIs, selective serotonin reuptake inhibitors; SNRIs, serotonin nonadrenaline reuptake inhibitors

How to evaluate a patient with Insomnia?

Diagnostic Evaluation (History and Examination)

The general criteria for the diagnosis of insomnia are displayed in Table 1. It is necessary that a patient fulfill these criteria before a diagnosis of insomnia can be made.

The American Academy of Sleep Medicine recommends that all health care practitioners ask all patients about insomnia as a part of any general health screening, particularly those patients at the increased risk for sleep problems, such as women, elderly patients, and those with multiple types of psychiatric problems. A complete sleep history should be obtained, including typical routines before bedtimes, bedtime and its regularity, sleep pattern across the night, numbers and duration of awakenings, normal wake up time and its regularity, and the quality of sleep.

It is equally important to ask about daytime symptoms, including excessive daytime sleepiness and the patterns of daytime napping. Typically, individuals with insomnia may complain of daytime fatigue, but they usually don't nap excessively. Patient should also be asked about consequence of insomnia e.g., "how does

your sleep problem affect your life?"

Because of higher rates of association between insomnia and medical disorders, especially psychiatric disorders, a complete medical assessment should be performed for all patients complaining of insomnia. The use of prescription and over the counter medication should be assessed because these may interfere with sleep. Many patients with insomnia tend to self medicate with alcohol, and although it can initially aid in sleep onset, alcohol tends to disrupt sleep later in the night as blood levels decline. Similarly, other substances such as caffeine, nicotine and stimulant drugs of abuse can produce insomnia. In some cases, a urine screen for toxic substances may be indicated.

Finally, patients should be asked about environmental and behavioral factors that may contribute to insomnia. Is the bed comfortable and the bedroom dark and quiet and at the appropriate temperature? Noise and heat, for example, can be highly disruptive of sleep. Behavioral factors are particularly important in chronic insomnia, because behavioral conditioning can become an important perpetuating factor in insomnia. Does the patient worry excessively about sleep and focus efforts on "trying" to sleep? Anxiety about sleep can lead to hyper arousal in the sleep setting, worsening the insomnia.

During the physical examination, the appearance of patients with insomnia may range from being hyper alert to frankly somnolent, suggesting diagnosis from primary insomnia, hyperthyroidism, abuse of stimulant drugs or anxiety disorder to sleep deprivation or sleep disorders such as sleep apnea. Hypertension, large neck circumference, enlarged tonsils, and/or narrowed oropharynx may suggest obstructive sleep apnea.(table 4)

A Sleep diary is probably the most helpful diagnostic tool in assessing insomnia, as well as following treatment response. Ideally, a patient should fill out a sleep diary for at least one week before the assessment to provide a representative picture of sleep behavior.

Management

The management of insomnia depends upon the cause and duration. In cases of secondary insomnia, those associated with SDB, RLS etc and medical illness, it is important to treat the cause and insomnia will improve consequently. However some common tools are as follows:

Table- 4: Diagnostic assessment of insomnia

Assessment of sleep complaint
Nature of sleep problem
Frequency
Severity
Duration
Effect on daytime function
Predisposing factors (e.g., chronic anxiety and reactivity to stress)
Precipitating factors (e.g., illness and stressor)
Behaviors related to sleep
Sleep schedule, regularity.
Napping.
Maladaptive habits related to sleep
Exercise Patterns
History of prior treatment and response.
Medication and substance use.
Over the counter medications
Prescription medications
Alcohol, caffeine, tobacco
Recreational drugs.
Medical history and examinations
Psychiatric history
Screen for sleep disorders
Sleep apnea (e.g, presence of snoring ,obesity and excessive daytime sleepiness.)
Restless legs/periodic limb movements (uncomfortable sensations or urge to move legs when resting, Frequent kicking during sleep).
Circadian rhythm disorder (sleep period occurring other than at the desired time).
Sleep diary or log

Non Pharmacological - Psychological and Behavioral Treatments for Insomnia (see Table 5)

There are conventional medicine, alternative medicines, psychotherapies, natural remedies, traditional medicines, as well as home remedies. The choice of the treatment method however depends on the gravity of the problem.

- Sleep Hygiene: The first step in non pharmacological treatment is the institution of proper sleep hygiene, or good sleep habits. Sleep hygiene is rarely effective when used alone, particularly in those with severe or chronic insomnia, but it makes the basis for more specific behavioral intervention. Sleep hygiene measures are intended to strengthen the physiologic

Table 5: Psychological and behavioral treatments for Insomnia

Therapy	Description
Stimulus Control therapy	A set of instructions designed to reassociate the bed/ bedroom with sleep and to re-establish a consistent sleep wake schedule: (1) Go to bed only when sleepy;(2) Get out of bed when unable to sleep;(3) use the bed/ bedroom for sleep only (no reading, watching TV, etc), (4) arise at the same time every morning;(5)no napping.
Sleep restriction therapy	A method designed to curtail time in bed to the actual amount of sleep time. For example, if a patient reports sleeping an average of 6 hours per night, out of 8 hour spent in bed, the initial recommended sleep window (from lights out to final arising time) would be restricted to 6 hours. Periodic adjustments to this sleep window are made contingent upon sleep efficiency, until optimal sleep duration is reached.
Relaxation training	Clinical procedures aimed at reducing somatic tension (e.g., progressive muscle relaxation, autogenic training) or intrusive thoughts at bedtime (e. g, imaginary training meditation) interfering with sleep.
Cognitive Therapy	Psychological methods aimed at challenging and changing misconceptions about sleep and faulty beliefs about insomnia and its perceived daytime consequences. Other cognitive procedures may include paradoxical intention or methods aimed at reducing or preventing excessive monitoring of and worrying about insomnia and its correlates/ consequences.
Sleep Hygiene education	General guidelines about health practices (e.g., diet, exercise, substance use) and environmental factors (e.g., light, noise, temperature) that may promote or interfere with sleep. This may also includes some basic information about normal Sleep and changes in sleep patterns with aging.

processes that govern sleep. Establishing a regular bedtime and, in particular, a regular wake up time reinforces the circadian rhythm; in combination with avoiding napping, it allows for a normal build of sleep deprivation across the day to create a homeostatic need for sleep at night. Daytime light exposure and physical activity also help entrain the circadian rhythm. The bedroom environment is important in that light, noise, and heat can all disturb sleep. Sleep hygiene measures also address issues of substance use and eating behaviors may interfere with sleep. Going to bed hungry or overly full can also disturb sleep.

- Cognitive behaviour therapy (CBT) - behavioral therapy is a popular insomnia solution method. But this treatment method is exclusively for people who have sleeping problems because of some psychological disorders. But what is more important here is that this treatment method is a comprehensive one. This includes a host of individual treatments like relaxation therapy, stimulus control therapy, sleep restriction therapy as well as cognitive therapy. Behavioral therapy can be used to cure insomnia separately as well as in combination with other medications.
- Herbal remedies although not preferred by everybody are simple and effective treatments, do not have many side effects and may also result in longterm benefit. Some of the common herbal remedies used for curing insomnia are Aswagandha, Jattamamsi, Hops, Californian Poppy, Passion flower, Dog wood, and Valerian root. Another important thing about herbal treatment for insomnia is that herbs can be used in various forms like herbal tea, decoctions as well as dry powder. However, these need to be confirmed in well-controlled trials. Some reports of the beneficial effects of the herbs have been reported.

Apart from all these a serious change in lifestyle can also cure insomnia. In fact in many cases of insomnia a stressful lifestyle, which leads to depression and anxiety, is found to be the main culprit for sleeping disorders. So correcting a stressful lifestyle can also be termed as insomnia treatment. Proper eating and sleeping habits, avoiding harmful substances like drugs and alcohol are some necessary lifestyle changes required to combat the sleeping disorder.

Pharmacological

A variety of pharmacologic agents are used in the treatment of insomnia, including those tested and approved for use as hypnotics, as well as a number of prescription and over-the-counter agents that may have sedating properties but have not necessarily been approved for use as hypnotics. The ideal hypnotic should improve sleep through reducing latency to sleep onset, decreasing time awake during the sleep period, increasing total sleep without disturbing normal sleep architecture, producing improved quality of sleep and leading to better daytime functioning without hangover effects.

Studies have shown that after control for major confounders, those who reported taking sleep medication “often” or “very often: had robustly increased mortality risks: hazard ratios of 4.54 (95% CI 2.47-8.37) in men and 2.03 (95% CI 1.07-3.86) in women. In men, frequent hypnotic use was associated with the highest hazard for all cause mortality: larger than smoking, diabetes, heart disease, hypertension, snoring, living alone, obesity, depression, hypertension, or insomnia. Similarly, in women, regular hypnotic usage was a strong predictor for overall hazard, though not the strongest. In addition to this, controlled trials have suggested that some hypnotics can cause depression.¹⁷ Other epidemiological studies and fragmentary controlled trials have also suggested that hypnotics may cause cancer.¹⁸

All currently available drugs that have an FDA indication for the treatment of insomnia are benzodiazepine receptor agonist (BzRAs) and include both benzodiazepine and newer non-benzodiazepine drugs that not only differ in chemical structure but also bind to the benzodiazepine receptor. Other drugs that are frequently used for insomnia include antidepressants, anti psychotics, antihistamines, and anticonvulsants. From the mid 1980-90’s the use of BzRAs declined by more than 50 %, whereas the use of sedating anti depressants increased by almost 150%. By 2002, it was estimated that trazodone, a sedating antidepressant, was the most commonly prescribed drug for insomnia, and three out of the top four drugs prescribed for insomnia were anti depressants.¹⁹

Benzodiazepines receptor agonist (BzRAs)

BzRAs include the older benzodiazepines and the newer BzRAs. There are several subtypes of GABA A receptors, benzodiazepine bind to all of them with equal affinity,

whereas some of newer agents, including zolpidem, zaleplon and indiplon, bind preferentially to the $\alpha 1$ subunit of the receptor, which has been associated with hypnotic and amnestic effects but not with anxiolytic effects.

Benzodiazepines approved for the treatment of insomnia include the longer-acting agents flurazepam, temazepam, quazepam and estazolam²⁰ and the FDA approved nonbenzodiazepine includes zolpidem, zaleplon and eszopiclone. The first two are more selective for the $\alpha 1$ subunit of the GABA A receptor whereas eszopiclone is less specific and also the longest half-life of these agents which is why it may be more effective for sleep maintenance; the other agents are primarily effective at sleep onset, although extended-release formulations of zolpidem and indiplon, when available may also be helpful for sleep maintenance.²¹

Anti-depressants

Although no anti-depressants are currently indicated for the treatment of the insomnia, in recent times they have been prescribed more frequently than BzRAs for insomnia. The most commonly used anti-depressants include trazodone, tricyclic anti-depressants (particularly amitriptyline and doxepin), and mirtazapine. When used as sleep agents, sedating anti-depressants tend to be used in doses sub therapeutic for depression. They are frequently combined with other less sedating or even activating anti-depressants.

Anti-depressants (e.g., SSRI's such fluoxetine, sertraline, paroxetine and citalopram; combined reuptake inhibitors such as venlafaxine and duloxetine; and bupropion) are commonly used to treat insomnia in patients with depression or alone in treating primary insomnia.²²

Antipsychotic medications

The newer atypical antipsychotic medications particularly, quetiapine and olanzapine, are often used for their sleep-promoting effects. Their primary indication is for the treatment of schizophrenia, and they are also used as mood-stabilizing and antimanic drugs in patients with bipolar disorders. Their primary mechanism of action is to block dopamine type 2 (D2) receptor, but sleep-inducing effect may be related to anti histamine effects and possibly to their effect on antagonism of 5-HT_{2C} receptors.²³

Over-the-counter agents

Antihistamines (usually diphenhydramine) are common active ingredients in many over-the-counter sleep aid. They act through antagonism of type 1 histamine (H₁) receptors and therefore enhance sleep by decreasing arousal due to histaminergic neuro transmission.²⁴

Melatonin, a hormone produced by the pineal gland, is normally secreted at night. Its secretion is inhibited by light, so that it effectively indicates the length of the night across the changing seasons. Melatonin serves as a modulator of circadian rhythms and of seasonal behaviors (such as reproduction) in some animals.^{25,26}

Before starting any form of pharmacotherapy discuss with the patient the outcome expected, duration of use, dangers of self-medication and dose escalation and role of frequent follow-ups.

The concept of combination therapy works well in some patients particularly those with chronic insomnia due to depression. In such cases one may have to combine an anti-depressant with short acting NBzRA for initial few days, before the action of anti depressant starts.

What about role of Yoga/meditation?

They can be considered to be a part of sleep hygiene advised to all patients to ensure relaxation. These can be either practised prior to sleep (Yog Nidra) or anytime during the day.

Follow up

Patients who end up taking medications more chronically (i.e., longer than one month) should be followed up regularly to document continued efficacy of the medication, watch for dosage escalation, and monitor side effects. Setting reasonable treatment goals is important to maximize success; these should include improvement not only in various aspects of nocturnal sleep but also in daytime function.¹⁶

Conclusion

Insomnia is primarily a symptom and for appropriate and effective treatment, it is mandatory to identify the cause. There are various treatment modalities available which should be individualized for each patient. Regular follow-ups are essential to ensure compliance. Only if

one follows the above principles can a good outcome be achieved.

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