

Understanding Insomnia and its Management

K M Ariff, M Med. 15 Jalan Syed Hussain, 02600 Arau, Perlis

Introduction

Sleep related problems are among the most frequently reported complaints in clinical practice. The physiological, psychological, social, occupational and public health implications of sleep difficulty have only been better understood in recent decades. Besides the distress and debilitation that sleep disorders cause, there is an increased tendency for sufferers to develop psychiatric disorders such as anxiety, depression, cognitive impairment, difficulties with complex motor performance and an increased risk of industrial and traffic accidents¹⁻³. Recent evidence that sleep disorders such as sleep apnoeas are associated with cardiovascular, cerebrovascular disease and sudden death should alert the medical community of the potential seriousness of the problem and develop strategies to manage them effectively⁴.

The discovery of modalities to assess sleep patterns objectively, such as polysomnography, has generated a greater understanding of normal and pathological sleep. It is now clear that sleep is not simply the absence of wakefulness as was considered earlier. Sleep is a complex, co-ordinated, physiological and behavioural state that depends on the relative strengths of two competing drives - the drives for wakefulness and that for sleep⁵. However, the precise function of sleep is still not clearly understood.

Physiology of Sleep

Sleep comprises two distinct physiological states: rapid eye movement sleep (REM sleep, paradoxical sleep) and non-rapid eye movement sleep (NREM sleep). Non-REM sleep is further subdivided into four stages (Stages 1 - 4). Stages 1 and 2 are light stages while stages 3 and 4 are deep sleep often referred to as slow wave sleep or delta sleep. REM sleep is the stage when most dreaming occurs. The first episode of REM sleep is experienced about 90 minutes after the onset of sleep. Progressing through the stages of non-REM sleep and REM sleep takes about 90 minutes and constitutes a sleep cycle. About 4 - 6 such cycles occur in normal individuals during a night's sleep. Most non-REM sleep occurs during the first two-thirds of the night while REM sleep occurs towards morning⁶. The division of total sleep time among the various sleep stages mentioned above constitutes normal sleep architecture.

Classification of Sleep Disorders

Sleep disorders as categorised in the International Classification for Sleep Disorders (1997) fall under four broad groups⁷. These are:

1. Dyssomnias:
 - a) Intrinsic sleep disorders such as psychophysiological insomnia, idiopathic insomnia, sleep apnoea syndromes, narcolepsy and the restless legs syndrome.

- b) Extrinsic sleep disorders such as environmental sleep disorder, inadequate sleep hygiene, adjustment sleep disorder, alcohol and stimulant dependent sleep disorders.
 - c) Circadian-rhythm sleep disorders e.g. jet-lag syndrome, shift work sleep disorders, and irregular sleep-wake pattern.
2. Parasomnias: These include sleep walking, sleep paralysis, sleep terrors, nightmares, sleep bruxism and sleep enuresis.
 3. Sleep Disorders Associated With Mental, Neurologic or other Medical Disorders e.g. psychoses, mood disorders, anxiety disorders, dementia, parkinsonism, cluster headaches, sleep related asthma and peptic ulcer disease.
 4. Proposed Sleep Disorders: They include short sleepers, long sleepers, menstrual and pregnancy associated sleep disorders.

This paper will focus primarily on the problem of insomnia, which constitutes the most common sleep problem encountered in primary care settings⁸.

What is Insomnia?

Insomnia is a subjective dissatisfaction with the duration and quality of sleep experienced. Based on the International Classification of Sleep Disorders (1997), insomnia can be the presenting complaint of about sixty discrete sleep disorders⁷. An attempt should therefore be made to clarify what the term 'insomnia' means to the individual patient. This could include the patient's perception or experience of difficulty initiating or maintaining sleep, waking too early or having non-restful sleep. There are wide variations in sleep requirements even within similar age groups. The average nightly sleep duration in young and middle-aged adults is about eight hours, being longer in children and less in the

elderly. Sleep requirements in an individual are influenced by neurobiological, cultural, genetic and cognitive factors. Individual perceptions of one's sleep requirements, personality and lifestyle are other factors⁹. Subjective complaints of dissatisfaction with sleep do not necessarily correlate with objective assessments during sleep laboratory testing. If a patient does not have impaired daytime alertness, and maintains a sense of well being and mental efficiency, he/she is probably getting sufficient sleep.

Causes of Insomnia

The causes of insomnia can be primary or secondary in origin¹⁰ (see Table I). Primary insomnia arises from dysfunction of the intricate sleep mechanisms in the brain.

Primary Insomnia

a) Adjustment sleep disorder

This is a self-limited insomnia occurring as a result of an obvious stressor such as hospitalisation, job loss or bereavement.

b) Psychophysiological insomnia

The insomnia caused by an adjustment sleep disorder may outlast the time course of the initial stressor and take a chronic course when it is referred to as psychophysiological insomnia. The initial affective arousal of the adjustment disorder settles but conditioning factors result in a persistent insomnia where an association is formed between the experience of going to bed and not sleeping¹¹. Sometimes referred to as 'learnt insomnia', the harder the patient tries to sleep, the worse the insomnia gets. Anticipatory anxiety and worrying about the inability to sleep aggravates the problem.

c) Idiopathic insomnia

This is a rare, lifelong disorder, of varying severity, usually commencing in childhood where the problem lies in initiating and maintaining sleep¹¹.

Table I
Common Causes of Insomnia

Primary Insomnia:

Adjustment sleep disorder e.g. hospitalisation, job loss, brief anxiety states
Psychophysiological insomnia
Idiopathic
Sleep state misperception

Secondary Insomnia:

Inadequate sleep hygiene
Environmental sleep disorder - noise, temperature, humidity
Psychiatric disorders - anxiety, depression, panic attacks, mania, schizophrenia, alcoholism
Medical illness and medications - nicotine, bronchodilators, steroids, beta-blockers, alcohol
Sleep wake cycle disorders - jet-lag, shift work, delayed sleep phase syndrome, advanced sleep phase syndrome
Restless legs and periodic limb movements of sleep
Sleep related breathing disorder - sleep apnoea, chronic obstructive pulmonary disease

d) Sleep state misperception

Patients with sleep state misperception generally do not realise that they were asleep and may complain that they have not slept for weeks or months. No objective evidence of sleep disturbance can be detected on sleep laboratory evaluation.

Secondary Insomnia

Secondary causes of insomnia include conditions where another disorder contributing to or aggravating the insomnia can be diagnosed.

a) Inadequate sleep hygiene

Inadequate sleep hygiene is a common cause where the patient does not habitually adhere to conditions and practices that promote continuous and effective sleep. Strenuous exercise, mental activities and consumption of caffeine close to bedtime, and compensating for lost sleep by frequent daytime napping and delayed waking are common unhealthy behaviours.

b) Environmental sleep disorder

Environmental factors such as noise, temperature changes, lighting, humidity, new sleeping environments, disturbance from a bed-partner (e.g. snoring) and discomfort from pillows and mattresses are common causes of insomnia.

c) Psychiatric disorders

An alteration in sleep pattern is almost universal in psychiatric illness. Psychiatric disorders such as anxiety and depression that are associated with affective arousal are common causes of insomnia. Other psychiatric disorders causing insomnia include schizophrenia, mania, panic disorders and alcoholism. Current evidence indicates that about 90% of depressed patients complain of disturbed sleep¹². Sleeplessness may also be a risk factor for the future development of depression¹³. The complaint of early morning awakening (late insomnia) as a characteristic feature of major depression has recently been reviewed. Current evidence from polysomnography shows that difficulties with falling asleep (increased sleep latency), frequent awakenings, diminished

proportions and amount of slow wave sleep, early onset of REM sleep (short REM latency) and increased REM sleep in the first half of the night are equally prevalent in major depression¹⁴.

d) Medical illness and medications

Medical causes of insomnia are numerous and include painful conditions arising from angina, acid-peptic disease, gastro-oesophageal reflux, cluster headaches, chronic pain syndromes and fibromyalgia. Other conditions include asthma, chronic obstructive pulmonary disease, cardiac failure, hyperthyroidism, diabetes, nocturia, parkinsonism and allergies. Several commonly used medications such as bronchodilators, antihypertensives and appetite suppressants can cause or aggravate insomnia. Abrupt withdrawal of hypnotic drugs such as benzodiazepines can result in a temporary worsening of insomnia, often referred to as 'rebound insomnia'. Alcohol intake close to bedtime can cause fragmented sleep and frequent awakenings later in the night.

e) Sleep-wake cycle disorders

Sleep-wake cycle disorders include shift work and the jet-lag syndrome. Jet-lag which is caused by the body's inability to adapt rapidly to time zone shifts of more than three to four has become common¹⁵. The mismatch between one's internal 'body-clock' and the new environment with its new time cues causes problems with sleep onset or maintenance, gastrointestinal upset, mood alterations and intellectual dysfunction¹⁵. There may be marked variations in the severity of symptoms, which tend to be worse when travelling east than travelling west. Other less common causes of insomnia resulting from disruption of circadian rhythms include the delayed sleep-phase syndrome, characterised by delayed sleep onset and final waking time relative to societal norms and the advanced sleep-phase syndrome characterised by early sleep onset and final wake time¹⁶.

f) Restless legs and Periodic limb movements of sleep

Restless legs syndrome (RLS) and periodic limb movements of sleep, as causes of insomnia are not often recognised. RLS which may be inherited is characterised by a desire to move the limbs (due to paresthesias / dysaesthesias often described as a 'creeping' or 'crawling' sensation) and motor abnormalities. Motor abnormalities include voluntary restlessness and involuntary periodic, stereotyped movements of the legs and sometimes other body parts¹⁷. Physical activity such as walking, kicking or stretching provides relief to symptoms. The symptoms are worse at rest occurring particularly upon reclining prior to sleep. RLS is usually idiopathic but may be associated with iron deficiency anaemia, pregnancy, leukaemia, uraemia, use of tricyclic antidepressants, selective serotonin reuptake inhibitors and normal ageing¹⁸.

Periodic limb movements of sleep (PMLS) or nocturnal myoclonus is characterised by kicking or twitching of the lower limbs during sleep occurring almost every 20 to 40 seconds. The patient is unaware of the movements, which result in brief arousals. The disorder can result in complaints of both insomnia and excessive daytime sleepiness though a complaint of insomnia is more common. About 80% of patients with RLS have unilateral or bilateral PMLS¹⁹.

g) Obstructive sleep apnoea

In obstructive sleep apnoea, patients usually present with complaints of excessive daytime sleepiness though some patients may complain of insomnia as a result of repeated awakenings during the night²⁰.

Assessment of the Patient

The evaluation of the patient should start with an adequate sleep/wake history to gather information on:

a) Time taken to fall asleep

In most age groups, sleep occurs within thirty minutes of going to bed. This period is prolonged in patients with sleep-onset insomnia. Common causes of a delay in falling asleep include adjustment sleep disorders, psychophysiological insomnia with high levels of arousal, inadequate sleep hygiene and medications.

b) Difficulties with staying asleep or waking early

Sleep disorders that cause fragmented sleep include medical illnesses (e.g. asthma, peptic ulcers), pain syndromes, periodic limb movements and sleep apnoea. Complaints of early morning awakening can be a feature of depressive illness.

c) Time of final awakening

Information on time of sleep onset and time of final awakening helps estimate sleep duration. Time of sleep onset and final awakening varies in sleep wake cycle disorders such as the advanced and delayed sleep phase syndromes.

d) Daytime sleepiness

Patients with inadequate or fragmented sleep may present with daytime sleepiness.

e) Perceived duration and expectations of sleep

This information helps the physician to clarify any misperception the patient may have about his sleep requirements.

f) Lifestyle factors that disrupt sleep

Knowledge of lifestyle factors that cause insomnia such as late night exercises, alcohol and caffeine can assist the physician to identify behavioural strategies that promote sleep.

g) Medical/psychiatric illness and medications

Sleep related complaints (especially insomnia) are common in patients with medical and psychiatric illnesses. Information on medications taken needs to be recorded with particular emphasis on

current and previous use of hypnotics (types, doses, response and side effects). Attention to sleep complaints can enhance the quality of life for patients with medical and psychiatric illnesses.

Interviewing the Bedroom Partner

A better insight into the patient's problem can be obtained by interviewing someone who shares his/her bedroom. Information should be sought on whether the patient:

a) Snores, chokes or stops breathing during sleep

Loud snoring, gasping or cessation of breathing is suggestive of obstructive sleep apnoea

b) Kicks or jerks his legs during sleep

Leg jerks and kicks suggest periodic limb movements of sleep (nocturnal myoclonus).

c) Has recent alteration in emotional state or mood

Psychiatric illness such as depression, anxiety and psychoses may be the underlying cause of the insomnia

d) Has recent change in alcohol, nicotine or consumption of other medications

Alcohol, nicotine and some medications can disrupt sleep.

Investigating the Patient

Prior to considering specific investigations, a complete physical and psychiatric evaluation should be performed. A detailed sleep history from the patient and an interview with the bedroom partner is often adequate to determine the underlying cause of the insomnia in most instances. Laboratory tests may be considered in those with medical problems such as hyperthyroidism, diabetes, anaemia and renal disease. In a patient with longstanding insomnia, a sleep diary can provide valuable information on the patient's sleep-wake pattern.

The sleep diary

A sleep diary maintained by the patient over a two-week period, in which the patient records the events preceding and during sleep (as listed above) often provides valuable diagnostic clues and identify individual management strategies. Although subjective, the record often serves as an inexpensive means of assessing the patient's perception of his/her quantity and quality of sleep.

Polysomnography

This investigation is of limited utility in the evaluation of insomnia and is not routinely recommended. Polysomnography may be necessary in those patients in whom there is suspicion of periodic limb movements in sleep, sleep apnoea, and in situations where the insomnia is severe and chronic in nature. Usually, the evaluation is performed overnight in a sleep laboratory where simultaneous recordings of electrocardiography, electroencephalography, electromyography, eye movements, pulse oximetry, nasal airflow, respiratory and abdominal movements are assessed to classify the insomnia.

An Approach to Management

A clear discussion with the patient explaining the underlying cause of the insomnia, the management strategies and likely outcomes while exploring the patient's expectations of treatment is an essential step. The management of insomnia includes non-pharmacological therapies, pharmacological therapies or a combination of both.

Non-pharmacological Therapies

Non-pharmacological therapies are ideal for chronic insomnia of more than three weeks duration and provide long term benefit but often take time to learn and implement. They include:

a) Patient education

A simple explanation on sleep needs and the sleep cycle can often be therapeutic for the patient who has rigid expectations of his sleep pattern.

b) Sleep hygiene

Some principles of sleep hygiene include making the sleep environment conducive, taking into consideration factors such as bedroom temperature, noise, humidity and lighting. A quiet and dark sleep environment is recommended taking into consideration the patient's preference and comfort. Emphasis should be laid on maintaining regular bedtime and waking routines even on weekends, avoiding daytime naps, regular exercise, avoidance of caffeinated beverages, alcohol, tobacco and alerting activities during bedtime.

c) Stimulus control therapy

Stimulus control therapy is particularly effective for psychophysiological insomnia and assists to recondition the experience of going to bed with sleep. The patient is advised to go to bed only when sleepy and if not asleep within 20 minutes to get up, go to another room and engage in some not too arousing activity such as reading, watching television or other passive activity. He is to return to bed only when sleepy and repeat the sequence until he falls asleep. The bed should be seen as a place to sleep and not to lie awake worrying.

d) Sleep restriction therapy

Sleep restriction therapy may benefit patients who spend long periods of time in bed with a short duration of sleep. Based on an assessment of the patient's sleep diary, the total time spent in bed and the average number of hours the patient sleeps is estimated. The patient is then advised to restrict the time in bed to match the previous number of hours spent asleep. As the patient's sleep pattern improves, the time spent in bed can be gradually increased. Sleep restriction therapy helps to improve sleep efficiency and consolidate the patient's sleep.

e) Dealing with tension and cognitive arousal

Learning and practising specific relaxation exercises helps to deal with physical and mental tension during bedtime. Progressive muscle relaxation (Jacobson's technique) which consists

of tensing and then relaxing different muscle groups in a systematic way is particularly useful. Other relaxation techniques include meditation, yoga, biofeedback therapy and guided imagery which involves focussing one's mind on a pleasant mental image. For patients with specific stressors such as sexual, marital or occupational problems referral to an appropriate therapist may be required. Studies comparing the various behavioural therapies for insomnia have shown that the most effective behavioural strategies are stimulus control and sleep restriction²¹.

Pharmacological Therapy

Pharmacological therapy with hypnotics is appropriate for rapid symptomatic relief in transient and short-term insomnia of less than three weeks duration (e.g. jet lag, adjustment sleep disorder and shift work sleep disorder). In chronic psychophysiological insomnia, hypnotic use should be limited to a period of two to three weeks while other behavioural therapies are being instituted. The benzodiazepines are still the most widely prescribed hypnotics, being safe especially in overdosage and are generally well tolerated. When selecting a benzodiazepine, the main factors to consider are the lipophilicity of the drug and the production of active metabolites, which prolong the elimination half-life of the drug. This can result in daytime somnolence. Diazepam has active metabolites and a long half-life (above twenty hours) compared to temazepam which has no active metabolites and a relatively shorter half-life. For transient and short term insomnia, an intermediate acting benzodiazepine (half life around ten hours) such as temazepam or lorazepam would be preferable to a long acting drug like diazepam. Temazepam or lorazepam in lower doses would also be preferable for the elderly though the increased risk of tolerance on repeated administration and rebound insomnia on rapid withdrawal can be disadvantages. Triazolam, a short acting benzodiazepine (half-life of four to six hours) has a reduced tendency to cause a morning after 'hangover' effect but may cause rebound insomnia, antegrade amnesia, delirium

and transient agitation particularly in the elderly²². Long-term use of hypnotics particularly the benzodiazepines is inappropriate due to problems of rebound insomnia, tolerance and dependence.

Newer non-benzodiazepine hypnotics include zopiclone (a cyclopyrrolone), zolpidem (an imidazopyridine) and zaleplon (a pyrazolopyrimidine). Zolpidem and zaleplon do not have active metabolites, have shorter duration of action and are not likely to cause 'rebound insomnia', residual daytime sleepiness and dependence²³. Sleep related breathing disorders, alcoholism and substance abuse are contraindications to the use of hypnotics.

Guidelines for hypnotic use include individualising dose requirements, prescribing the lowest effective dose and avoiding nightly doses if possible. Their duration of use should be limited to a period of less than three or four weeks (unless treating depression with an antidepressant) and tapering the dosage during withdrawal. Sedating antihistamines are sometimes used in treating insomnia. Antihistamines can cause decreased cognitive function, anticholinergic side effects and daytime sleepiness. Tricyclic antidepressants such as dothiepin are beneficial for patients with insomnia associated with depression. Prescription of hypnotic agents alone for the insomnia associated with depression is inappropriate. Caution needs to be exercised in prescribing tricyclic antidepressants to the elderly due to their anticholinergic and cardiovascular side effects.

Management of jet-lag includes advice on behavioural changes, re-scheduling sleep and waking times, timed daylight exposure and the use of short acting hypnotic agents such as triazolam and zolpidem. Melatonin analogues have been studied for their effectiveness in 'resetting the biological clock' and in treating sleep disorders in jet-lag and shift workers. Until the results of methodologically sound trials proving its efficacy, safety and dosage are available, claims of its efficacy should be considered anecdotal.

Currently used modalities of treatment for the idiopathic forms of RLS and PMLS include levodopa, baclofen, opiates, temazepam and clonazepam²⁴⁻²⁵. Specific sleep disorders that cause insomnia such as sleep apnoea, restless legs or arising from an underlying medical illness may require referral to the appropriate specialist.

Conclusion

Insomnia is a symptomatic manifestation of a wide array of sleep disorders and is not a diagnosis in or of itself. A detailed sleep history

together with a complete physical and psychiatric evaluation is usually sufficient to explain the cause of the insomnia in most patients. An attempt should be made to search for an underlying cause before treatment is initiated. Insomnia can cause significant morbidity and mortality and the complaint should be taken seriously. Incorporating a combination of behavioural and pharmacological interventions is often necessary. The experience of treating a patient distressed by insomnia is often rewarding and satisfying for the physician and a gratifying one for the patient.

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CONTINUING MEDICAL EDUCATION

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M.C.Q.s on the Article Understanding Insomnia and its Management

1. Factors that disrupt sleep architecture include:
 - A. periodic limb movements of sleep
 - B. prior sleep deprivation
 - C. coexisting medical disorders
 - D. medications
 - E. adequate sleep hygiene

2. Factors influencing the choice of a hypnotic are:
 - A. the elimination half-life of the agent
 - B. the tendency for the hypnotic to cause tolerance
 - C. the tendency for the hypnotic to cause rebound insomnia
 - D. the safety of the hypnotic in sleep related breathing disorders
 - E. the safety of the drug in alcoholism

3. In psychophysiological insomnia:
 - A. an association is formed between going to bed and not sleeping
 - B. long-term administration of a hypnotic is often indicated
 - C. stimulus control therapy is inappropriate
 - D. polysomnography is an important diagnostic test
 - E. other sleep disorders may co-exist

4. In the jet-lag syndrome:
 - A. symptoms tend to be worse when travelling westward
 - B. adapting behaviour to local time on arrival reduces the severity of symptoms
 - C. symptoms decrease with increasing age
 - D. A short acting hypnotic for a limited period may be indicated
 - E. Psychological stress may aggravate the severity

5. The following medications are effective in treating the restless legs syndrome:
 - A. clonazepam
 - B. opiates
 - C. tricyclic antidepressants
 - D. levodopa/carbidopa preparations
 - E. selective serotonin reuptake inhibitors