

Continuing Professional
Development

CPD

AUTHOR: Motty Varghese RPSGT, Sleep Physiologist

Motty completed his BSc (Allied Health Sciences) with specialisation in Respiratory physiology in 2000. He registered with the Board of Polysomnography Technologists in the United States in 2008 after acquiring his international RPSGT certification. Motty attended training programmes in CBTi in Circadian and neuroscience institute in the University of Oxford and completed a mini-fellowship in Behavioural Sleep Medicine from Perelman School of Medicine at the University of Pennsylvania. He worked as a Senior Respiratory and Sleep Physiologist at St. James's Hospital from 2003 to 2018.

Motty currently manages the Sleep Therapy Clinic, a Behavioural Sleep Medicine clinic where he offers non-medication treatment for insomnia and circadian rhythm disorders, and sleep diagnostic services.

Motty is a member of the Irish Sleep Society and the European Sleep Research Society.



60 Second Summary

Sleep medicine as a clinical speciality and awareness of sleep disorders have grown over the last few decades. The awareness of sleep disorders is not satisfactory, and effort needs to be made for the identification, diagnosis, and treatment of sleep disorders.

Approximately 10% of the adult population suffers from an insomnia disorder and another 20% of the global population experiences occasional insomnia. Women, older individuals, and individuals with anxiety are predisposed to insomnia.

The reasons for sleep loss are multifactorial. The prominent factors are lifestyle-related factors (irregular sleep schedules, shift-work related), environmental factors, psychosocial factors, and factors associated with sleep disorders (sleep-breathing disorders, insomnia, and other disorders).

Several large epidemiological studies have found an association between heart disease and sleep disruption.

The association between shorter sleep times and impaired glucose tolerance is also well-established in experimental studies. When sleep was restricted to four hours or less for a total of 6 nights led to impaired glucose tolerance. However, when sleep duration was normalized this effect had resolved and glucose tolerance returned to normal levels.

The common symptoms of OSA are snoring, witnessed apneas (witnessed by bed partner), and excessive daytime sleepiness. Morning headaches are also reported commonly, but not always.

An insomnia disorder is defined as a persistent difficulty with sleep initiation, duration, or consolidation that occurs despite adequate opportunity and circumstances for sleep and results in concern, dissatisfaction, or perceived daytime impairment, such as fatigue, decreased mood or irritability, general malaise, or cognitive impairment.

1. REFLECT - Before reading this module, consider the following: Will this clinical area be relevant to my practice?

2. IDENTIFY - If the answer is no, I may still be interested in the area but the article may not contribute towards my continuing professional development (CPD). If the answer is yes, I should identify any knowledge gaps in the clinical area.

3. PLAN - If I have identified a

knowledge gap - will this article satisfy those needs - or will more reading be required?

4. EVALUATE - Did this article meet my learning needs - and how has my practise changed as a result? Have I identified further learning needs?

5. WHAT NEXT - At this time you may like to record your learning for future use or assessment. Follow the

4 previous steps, log and record your findings.

Published by HPN.
Copies can be downloaded from www.irishpharmacytraining.ie

Disclaimer: All material published is copyright, no part of this can be used in any other publication without permission of the publishers and author. Nytol has no editorial oversight of the CPD programmes included in these modules.

Sleep Disorders on the Rise: What Community Pharmacies can do about it

Sleep medicine as a clinical speciality and awareness of sleep disorders have grown over the last few decades. The awareness of sleep disorders is not satisfactory, and effort needs to be made for the identification, diagnosis, and treatment of sleep disorders.

The International Classification of Sleep Disorders lists approximately 90 different types of sleep disorders, and sleep breathing disorders like obstructive sleep apnea, and Insomnia that result in the loss of sleep duration are the most prevalent ones. When the American Academy of Sleep Medicine 2012 diagnostic criteria were used to identify sleep apnea, an alarming 936 million adults aged between 30 and 69 years of age were estimated to have mild to severe obstructive sleep apnea and 425 million adults aged between 30 and 69 years of age have moderate to severe sleep apnea globally. This shows the global high prevalence of sleep apnea with approximately 1 billion people affected by sleep breathing disorder. The prevalence exceeds 50% in some countries, highlighting the importance of effective access to sleep medicine practitioners, and diagnostic and therapeutic strategies.

Approximately 10% of the adult population suffers from an insomnia disorder and another 20% of the global population experiences occasional insomnia. Women, older individuals, and individuals with anxiety are predisposed to insomnia. In a survey carried out among pharmacists in Ireland in January 2024, one in three pharmacists reported that 11% or more of their customers consult and purchase sleep aids in a week.

In Ireland, the national prevalence data is not available for clinical sleep disorders including sleep breathing disorders. However, the global trend in the increased prevalence of sleep breathing disorders applies to Ireland and much of the Western countries due to both aging and obesity. International incidence trends also show that men are two and a half to three times more likely to be diagnosed with sleep apnea compared to women.

From the above statistics, the high prevalence of sleep disorders is evident, and they are also frequently overlooked despite being readily treatable health problems. Sleep disorders also have significant public health consequences including errors

in judgment contributing to disastrous events and accidents, but not limited to them. The more common, but less noticeable ones are the effects they have on public health indicators including mortality, morbidity, performance degradation, accidents, and injuries, functioning and quality of life, family well-being, and health care utilization.

The etiology of sleep disruption

The reasons for sleep loss are multifactorial. The prominent factors are lifestyle-related factors (irregular sleep schedules, shift-work related), environmental factors, psychosocial factors, and factors associated with sleep disorders (sleep-breathing disorders, insomnia, and other disorders). While lifestyle-related factors can be modified with behaviour changes, environmental factors can be optimized, and psychosocial factors and sleep disorders need to be assessed, diagnosed, and treated by qualified professionals.

Sleep disruption, both from sleep loss and sleep disorders is associated with a profound and significant impact on human health. These can be divided into short-term and long-term health consequences. The short-term



One-A-Night 50mg Tablets Diphenhydramine Hydrochloride

Product not subject to medical prescription. Further information is available upon request or in the SmPC: <https://www.medicines.ie/medicines/nytol-one-a-night-50-mg-tablets-34889/spc>
MAH: Chetaro Ireland DAC. The Sharp Building, Hogan Place, Dublin 2, Ireland.



consequences include increased stress responsivity, somatic problems, reduced quality of life, emotional distress, issues with cognition, memory and performance deficits, mood disorders, and other mental health problems. The long-term consequences associated with sleep disruption are hypertension, dyslipidemia, metabolic syndrome, cardiovascular diseases, type 2 diabetes mellitus, difficulty with weight management, and gastrointestinal disorders. Sleep disruption is a risk factor for the above health difficulties and research has proven that they are not limited to it.

Sleep disruption and cardiovascular morbidity

Several large epidemiological studies have found an association between heart disease and sleep disruption.

In experimental studies done in mice, the formation of atherosclerosis was triggered by frequently disrupting the sleep cycles. These mice also had elevated white blood cells indicative of inflammation.

Five hours of sleep or less is associated with a significant increase in risk. Increased sympathetic nervous system activity is also identified as a factor that links sleep deprivation to coronary diseases.

Sleep disruption, diabetes mellitus, and impaired glucose tolerance

Impaired glucose tolerance is a precursor to diabetes. In the sleep heart health study adults who reported five hours of sleep or less were two and half times more likely to have diabetes compared with those who slept 7 to 8 hours per night those reporting six hours per night were about 1.7 times more likely to have diabetes. The association between shorter sleep times and impaired glucose tolerance is also well-established in experimental studies. When sleep was restricted to four hours or less for a total of 6 nights led to impaired glucose tolerance. However, when sleep duration was normalized this effect had resolved and glucose tolerance returned to normal levels. This association between sleep loss and diabetes or impaired glucose

tolerance may also be mediating the relationship between sleep loss and cardiovascular morbidity described above.

Sleep disruption, obesity, and weight management

In a prospective 13-year study of nearly 500 adults, it was shown that by age 27 individuals with short sleep duration were seven and half times more likely to have a higher body mass index after controlling for confounding factors such as family history levels of physical activity and demographic factors.

A link between two appetite-regulating hormones has also been identified as a potential reason for this weight gain. Sleep disruption was associated with lower levels of leptin, a hormone produced by adipose tissue that suppresses appetite, and higher levels of Ghrelin, a peptide that stimulates appetite. Sleep deprivation results in an imbalance of these two appetite-regulating hormones mediates an increase in appetite, and exhibits the relationship between sleep deprivation and obesity. Other mechanisms

including the effects of sleep deprivation on the sympathetic nervous system have also been proposed as a potential reason for weight gain.

Obesity also contributes to obstructive sleep apnea through fat deposition and Airways causing them to narrow. External and internal neck circumferences and the degree of obesity are important predictors of sleep apnea.

Sleep deprivation, mental health, and alcohol use

Adults with chronic sleep loss reported excessive mental distress, depressive symptoms, anxiety, and alcohol use. Unfortunately, this was also true for adolescents. In a study with more than 3000 high school students inadequate sleep was associated with higher levels of depressed mood, anxiety behavior problems, and alcohol use. A bidirectional relationship has also been proven with sleep laws and mental health problems.

Obstructive sleep apnea

The hallmark features of obstructive sleep apnea (OSA) are bouts of



One-A-Night 50_{mg} Tablets **Diphenhydramine Hydrochloride**

Product not subject to medical prescription. Further information is available upon request or in the SmPC: <https://www.medicines.ie/medicines/nytol-one-a-night-50-mg-tablets-34889/spc>
MAH: Chetaro Ireland DAC. The Sharp Building, Hogan Place, Dublin 2, Ireland.



total or partial airway collapse accompanied by a drop in oxygen saturation or an increase in arousal from sleep. The frequent and multiple arousals result in non-restorative sleep with immediate consequences of reduced quality of life, and attention deficits that can result in accidents while engaged in safety-critical tasks. The frequent oxygen desaturations and resaturations can result in the development of metabolic disorders and inflammatory responses.

The symptoms of sleep apnea include loud, disruptive snoring, witnessed apneas during sleep, and excessive daytime sleepiness.

Etiology

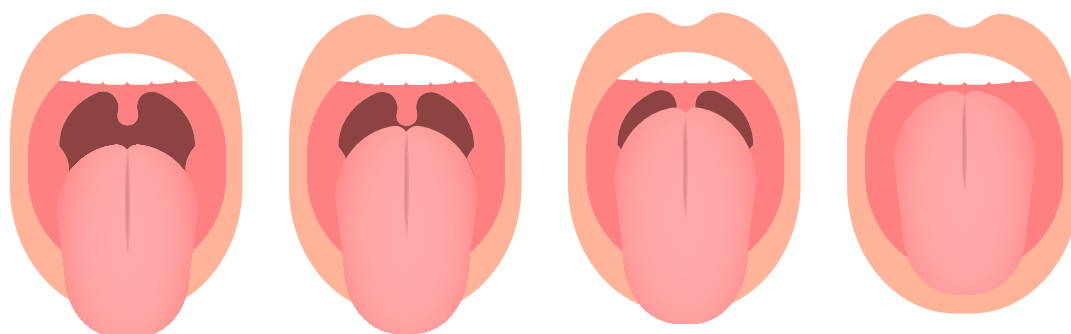
Sleep apnea is the result of pharyngeal narrowing and partial or complete closure and obstruction to the airflow. This is a complex mechanism and multiple factors play a role in it. There are anatomical factors like retrognathia, mandibular hypoplasia, adenoid, and tonsillar hypertrophy that could contribute to the development of sleep apnea. Anatomical factors combined with sleep-related reduced ventilatory drive play a significant role in upper airway obstruction. Non-anatomical risk factors are central fat distribution, obesity, advanced age, male gender, and supine sleeping position. Alcohol use, smoking and use of sedatives or hypnotics can also be contributing factors.

Pathogenesis of obstructive sleep apnea

As described above, the snoring and witnessed apneas are due to the repetitive closure of the upper airways. A narrow upper airway is generally more collapsible than a larger one. The upper airway cross-sectional area is significantly reduced in patients with OSA. The altered arrangement of soft tissues in patients with OSA also makes it prone to collapse. Multiple methodologies have shown that a compromised upper airway anatomy and the development of negative pressure increases the collapsibility of the upper airway resulting in narrowing and closure and the observed symptoms.

Evaluation and diagnosis

The common symptoms of OSA are snoring, witnessed apneas (witnessed by bed partner), and excessive daytime sleepiness. Morning headaches are also reported commonly, but not



CLASS I
Complete
visualization of
the soft palate

CLASS II
Complete
visualization
of the uvula

CLASS III
Visualization
of only the
base of the uvula

CLASS IV
Soft palate
is not
visible at all

always. An adult with unexplained daytime sleepiness or sleep-related symptoms like snoring, and frequent body movements should be evaluated for sleep apnea.

Physical examination should include evaluation of anatomical risk factors and non-anatomic risk factors like elevated BMI, collar size, and co-existing health issues. Mallampatti score is a useful method to assess oropharyngeal crowding.

Screening questionnaires like stop-bang questionnaire is useful for screening for sleep apnea. Excessive daytime sleepiness can be assessed by the Epworth sleepiness scale.

An in-lab polysomnography test is the gold standard diagnostic test for the diagnosis of Obstructive sleep apnea. During the test, patients are monitored with EEG leads, pulse oximetry, temperature, and pressure sensors to detect nasal and oral airflow, respiratory impedance plethysmography belts around the chest and abdomen to detect motion, an ECG lead, and EMG sensors to detect muscle contraction in the chin, chest, and legs. The purpose of the test is to identify sleep and wakefulness and also to detect the presence and frequency of apneic or hypopneic events during sleep. An apnea is the cessation of breathing, and a hypopnea is the reduction in the flow of breathing.

The severity of OSA in adults is based on the following criteria:

- Mild: 5 to 15 events per hour
- Moderate: >15 to 30 events per hour
- Severe: greater than 30 events per hour

Treatment of Obstructive sleep apnea

The treatment of OSA usually depends on the etiology and the severity of the disease. Continuous positive Airway Pressure (CPAP therapy) is a common treatment prescribed for individuals with OSA when the symptoms and test reports warrant it. CPAP therapy involves introducing an airflow into the upper airway at a certain pressure to prevent the collapse of the upper airway and to maintain its patency to ensure smoother airflow through to the lungs to facilitate better oxygenation and restful sleep.

Other modalities include the use of a mandibular advancement device to expand the pharyngeal space during sleep and a positional device to prevent individuals from sleeping in the supine position in the case of positional sleep apnea. Weight loss is also another strategy but is seldom achieved.

Insomnia

An insomnia disorder is defined as a persistent difficulty with sleep

initiation, duration, or consolidation that occurs despite adequate opportunity and circumstances for sleep and results in concern, dissatisfaction, or perceived daytime impairment, such as fatigue, decreased mood or irritability, general malaise, or cognitive impairment. Among adults with insomnia disorder, sleep complaints typically include difficulties initiating or maintaining sleep. Due to its chronic nature, insomnia is associated with substantial impairment in an individual's quality of life.

A prolonged sleep onset latency of 30 minutes or longer, with a minimum of thrice a weekly occurrence is categorized as sleep onset insomnia. If an individual takes 30 minutes or longer to return to sleep upon awakening at night is suffering from sleep maintenance insomnia. If an individual wakes up earlier in the morning by 30 minutes or longer and does not return to sleep, it is characteristic of early morning awakening insomnia.

The pharmacist's survey in Ireland also identified difficulty falling asleep and returning to sleep as the main sleep complaints presented to them by members of the public.

Pathogenesis of insomnia

Insomnia is a disorder of hyperarousal. The cognitive model

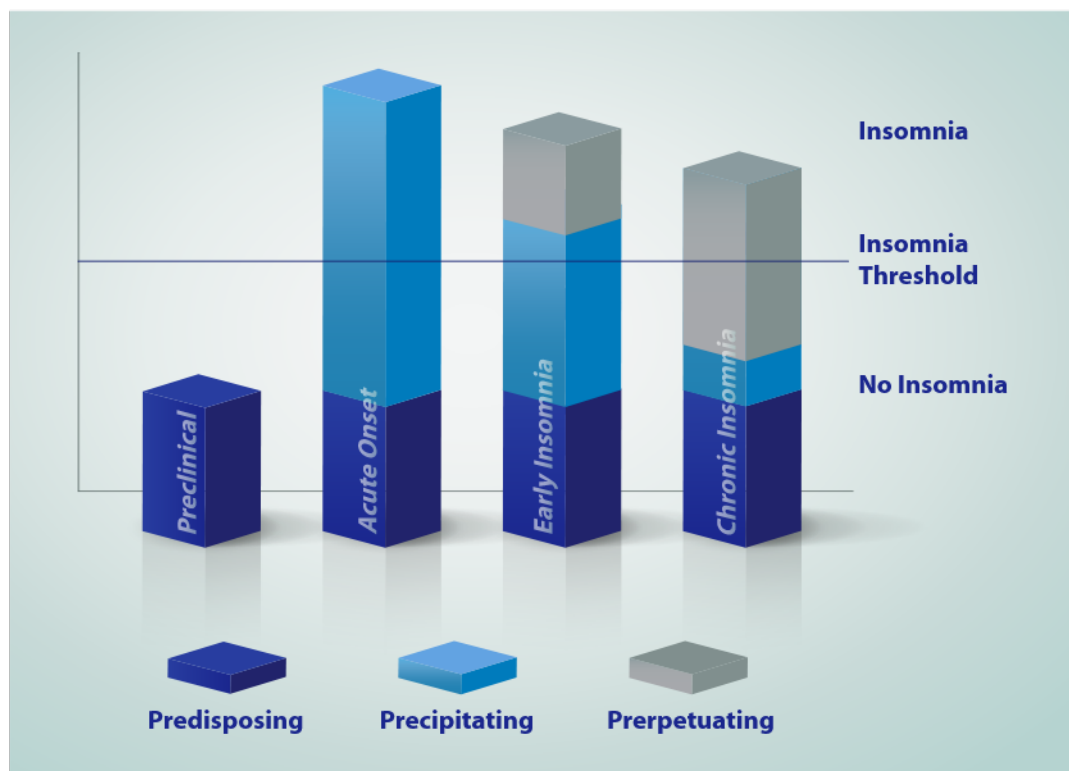


One-A-Night 50_{mg} Tablets

Diphenhydramine Hydrochloride

Product not subject to medical prescription. Further information is available upon request or in the SmPC: <https://www.medicines.ie/medicines/nytol-one-a-night-50-mg-tablets-34889/spc>
MAH: Chelaro Ireland DAC. The Sharp Building, Hogan Place, Dublin 2, Ireland.





of insomnia (3 P model) suggests that life stresses can act as a precipitating factor of poor sleep, for a predisposed person. Anxious tendencies, female gender, and old age are some of the predisposing factors to develop insomnia.

The worry and rumination about stressors can lead to an acute episode of insomnia with difficulty falling asleep or difficulty returning to sleep. Once an individual consistently sleeps poorly, the worry shifts from life events to poor sleep itself and it is often these anxious thoughts related to poor sleep and the resultant hypervigilance that perpetuates the poor sleep.

Assessment and diagnosis of insomnia

Insomnia is primarily diagnosed by clinical evaluation through a thorough sleep history and detailed medical, substance, and psychiatric history. The sleep history should cover specific insomnia complaints, pre-sleep conditions, sleep-wake patterns, other sleep-related symptoms, and daytime consequences.

The history helps to establish the type and evolution of insomnia, perpetuating factors, and identification of comorbid medical, substance, and/or psychiatric conditions. Instruments which

are helpful in the evaluation and differential diagnosis of insomnia include self-administered questionnaires, at-home sleep logs, symptom checklists, psychological screening tests, and bed partner interviews.

Treatment of insomnia

The American Academy of Sleep Medicine recommends that clinicians use multicomponent cognitive behavioural therapy for insomnia (CBT-I) for the treatment of chronic insomnia disorder in adults.

CBT-I combines one or more of the cognitive therapy strategies with education about sleep regulation plus stimulus control instructions and sleep restriction therapy. CBT-I also often includes sleep hygiene education, relaxation training, and other counter-arousal methods. Treatment progresses using information typically gathered with sleep diaries completed by the patient throughout treatment.

The pharmacist's role in the management of sleep disorders

The undetected sleep disorders present with significant public health consequences and pharmacists and pharmacy staff are uniquely placed to contribute to the management of these

sleep disorders by identifying, counselling, prescribing, educating, and referring them to sleep health professionals.

For individuals presenting with snoring, witnessed apnoeas, and excessive daytime sleepiness, explaining the referral pathway and advising them to consult with the GP or a respiratory/sleep physician will enable them to undergo an evaluation, diagnostic tests, and finally establish treatment.

An acute insomnia sufferer stands to benefit from immediate intervention by a pharmacist. Insomnia is perpetuated by the anxiety the individual maintains about sleep. Sleep education will be useful to help them to rationalise their anxieties and reduce hypervigilance which can pave the way to better sleep.

Sleep hygiene measures are also extremely useful in the early stages of poor sleep to improve sleep. These include:

1. Consistent bedtime and wake time. Make sure you have a consistent bedtime and wake time. This will help to optimize your sleep drive. Sleep drive or sleepiness is determined by the amount of wake hours you have before going to bed at night

2. Avoid bright light exposure to facilitate the production of sleep hormone - Melatonin.
3. Limit caffeine consumption and have none in the afternoon. Caffeine can have a long half-life in sensitive individuals and avoid caffeine for 8 hrs before your bedtime. Caffeine is found in tea, coffee, soft drinks, chocolate, etc
4. Cooler body temperature promotes sleep. Promote the body's natural tendency to reduce the body temperature by avoiding eating late, exercising, and avoiding a hot shower in the last 2 hours before bedtime.
5. Avoid alcohol within 3 hrs of bedtime. Once alcohol is metabolized, you may wake up and can stay awake or sleep poorly for the rest of the night.
6. Schedule some "worry time"/journaling time in the late afternoon or early evening. Use this time to plan activities for the next day or to think about things that may cause you to feel upset, angry, or anxious
7. Remember sleep is a natural process and the result of building up sleep drive/sleepiness. It is like feeling hungry and feeling thirsty and will happen naturally. Find comfort in the fact that you do not need to force it to happen.

If the individual has developed chronicity to their insomnia and exhibits anxiety about their inability to sleep and if there is any evidence of dysfunctional beliefs and attitudes about sleep, they will benefit from attending a behavioural sleep medicine practitioner/therapist to address their insomnia.

To summarise, sleep disorders and its increased prevalence poses a significant risk to public health. Sleep disorders are often associated with other comorbidities like cardiovascular diseases, hypertension, diabetes mellitus, anxiety, mood disorders. Identifying and addressing common sleep disorders including obstructive sleep apnea, and insomnia is imperative to this effort. Pharmacists are uniquely positioned to be of help to this client group. The services they can provide include assessment for common sleep disorders, sleep education, advising sleep hygiene measures, appropriate dispensing of sleep medications, and educating the patients on the referral pathway.



One-A-Night 50_{mg} Tablets

Diphenhydramine Hydrochloride

Product not subject to medical prescription. Further information is available upon request or in the SmPC: <https://www.medicines.ie/medicines/nytol-one-a-night-50-mg-tablets-34889/spc>
MAH: Chefaro Ireland DAC. The Sharp Building, Hogan Place, Dublin 2, Ireland.

