APS practice certificate in sleep psychology

Part 1: Introduction to sleep psychology

Learner Guide
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1. What is sleep?

1 Learning objectives

Welcome to this online course in the APS/ASA Sleep Practice Certificate.

There are four courses and together they comprise a practice certificate. They can also be done individually; it is not compulsory to do the practice certificate.

Course 1 Introduction is a larger course comprising approximately 30% of the program content. We would advise you to pace yourself as you work through this content. It provides foundational knowledge for the remaining three courses.

At the end of this course participants should:

- Be aware of the underlying physiology of sleep including how our sleep changes across the lifespan
- Be aware of the importance of good sleep, including the proposed theories for why we sleep and the health consequences of poor sleep and of the social and cultural factors surrounding sleep.
- Be aware of the classification systems within the sleep field
- Be able to know the diagnostic criteria for the major sleep disorders, including insomnia, obstructive sleep apnoea, restless legs syndrome, narcolepsy and Delayed Sleep Phase Syndrome (DSPS)
- Be familiar with ways in which sleep disorders can be assessed
- Be aware of the various ways in which sleep can be measured
- Be aware of “healthy sleep practices” and how to bring them into treatment plans
- Know the treatment principles surrounding the management of sleep disorders
- This module will conclude with a final assessment consisting of multiple choice questions to check your understanding of the subject matter.

2 Sleep disorders

Sleep is an essential component of our health. Resulting daytime distress and impairment are core features shared by all of the sleep disorders.

Even though sleep comprises an essential part of our mental and physical health, around 10% of Australians have a diagnosed sleep disorder. This is thought to be an under-estimated figure as many people are unaware that they have a sleep disorder.

Sleep is what we do for approximately a third of our lives and remarkably we know very little about it compared to other aspects of our health. Until there are issues with it most people do not think much about their sleep. Enormous advances have been made in this field in the past 50 years. There is growing emphasis on the importance of sleep science within the medical and psychological fields.

Although there is still much to learn about sleep, many advances have been made. What we do know is that it is a complex state in which many important functions occur, and without adequate amounts of good quality sleep our health is at risk.
3 A pillar of health

Sleep is one of the main pillars of health

Above all, sleep is important for our health. In fact it is just as important for our health as our fitness and nutrition yet often doesn’t get as much attention or priority. It should be considered one of the main pillars of health. The Sleep Health Foundation (Australia) states that the role of optimal sleep in our lives is as important to our health as good nutrition and good levels of physical fitness.

Sleep plays a vital role in our health and well-being and the goal is to get this message out to the general public.

4 Sleep physiology

To describe and define sleep one needs to look at it from many different perspectives.

One could comment upon the experience of sleep, or as an observer what it looks like, or from a neurophysiological perspective or from a functional perspective.

- Experiencing sleep: State of unawareness of external environment - depending on the sleep stage
- Observing sleep: When we observe someone asleep they seem quiet, eyes closed, unresponsive
- Neurophysiological: Surface EEG shows us a pattern of sleep, there are distinct changes in the electrical signals within the brain comparing sleep with wake, and within the different stages of sleep
- Functional: When sleep is not impaired it serves as as restorative biological process which allows us to return to baseline function each day

In all of these examples of the experiential, the observable, the measurable and functional aspects of sleep there is a lot more to sleep than meets the eye. A scientific approach to sleep is required and the last fifty years particularly have focused on trying to understand what sleep actually is.

5 Definitions of Sleep

Scientists have noted the following characteristics that accompany and in many ways define sleep:

- Sleep is a period of reduced activity.
- Sleep is associated with a typical posture, such as lying down with eyes closed in humans.
- Sleep results in a decreased responsiveness to external stimuli.
- Sleep is a state that is relatively easy to reverse (this distinguishes sleep from other states of reduced consciousness, such as hibernation and coma).

This last point is a particularly important point with relevance to the treatment of insomnia. People suffering from insomnia often need their expectations of sleep reset. That is, they are craving a state of near oblivion with their sleep and even within normal sleep this is not possible to achieve. This will be expanded upon further when insomnia is discussed later in this module, and in more detail in module 2.
6 EEG activity

EEG activity shows REM and non REM sleep. Sleep is prompted by natural cycles of activity in the brain and consists of two basic states:

1. rapid eye movement (REM) sleep and
2. non-rapid eye movement (NREM) sleep

Non-REM sleep occurs in four stages from light to deepest sleep.

- Stage 1 - lightest NREM sleep (N1)
- Stage 2 - moderate NREM sleep (N2)
- Stage 3 - deep NREM sleep (N3)
- Stage 4 - deepest NREM sleep (N3)

During sleep, the body cycles between non-REM and REM sleep. Typically, people begin the sleep cycle with a period of non-REM sleep followed by a very short period of REM sleep. Then, throughout the rest of the sleep period REM increases in frequency and duration and the majority of REM is experienced in the latter stages of the sleep period.

The pattern of sleep and the typical distribution of the various sleep stages (REM and non-REM sleep) is known as “sleep architecture” and is typically displayed in a graph known as a ‘hypnogram’.
7 Rapid Eye Movements

We know that sleep has REM and non-REM stages

During sleep physiological demands are reduced and core body temperature and blood pressure drop. In general, many of our physiological functions such as brain wave activity, breathing, and heart rate are quite variable when we are awake or during REM sleep but are quite regular and stable when we are in non-REM sleep.

The REM (Rapid Eye Movement) state was discovered in 1953 by Aserinsky and Kleitman. Most of our dreaming occurs in REM, although there are still dreams in nonREM sleep too.

The state of sleep has different electroencephlographic (EEG) patterns than wakefulness, and in addition to this, there are different EEG patterns within the stages of sleep. We will look at how EEG patterns vary across the sleep stages as well as the electro-oculogram (EOG) which measures the electrical activity within the eyes, and the electrical activity of the muscles (EMG) throughout the sleep stages.

8 Cycles of sleep

The period of NREM sleep is made up of stages 1 (N1) to stages 3 and 4 (N3). Each stage can last from 5 to 15 minutes. A completed cycle of sleep consists of a progression from stages 1 (N1) to 4 (N3) before REM sleep is attained, then the cycle starts over again.

A cycle of sleep takes approximately 90 minutes in a human adult. Human infants have approximately a 45 minute sleep cycle.

Usually, REM sleep occurs 90 minutes after sleep onset. The first period of REM typically lasts 10 minutes. As the sleep period progresses the REM periods become more frequent and longer in duration. The final period of REM sleep may last for up to an hour. This diagram shows the different sleep stages and their corresponding EEG patterns and amplitudes.

(Adapted from Hockenbury & Hockenbury, 2003)
9 Awake and sleep stages

The EEG is used to monitor brainwaves, the EOG is used to monitor eye movements while sleeping and the EMG measures muscle tension.

Usually the transition into sleep is via Stage 1 (N1) from being awake.

As the sleep period progresses there is a transition to Stage 2 (N2).

Stages 3 & 4 (N3) follow and combined are known as slow wave sleep.

As you can see by the EEG brain patterns in Stages 3 & 4 (N3), the brain waves become slower and higher.

REM sleep can occur after a person has transitioned into stage 1 (N1), 2 (N2), 3 (N3), 4 (N3) and then back to stages 3 (N3), 2 (N2), 1 (N1) and then REM occurs.

10 Sleep stages (N1 and N2)

Awake

When we are awake we are fully conscious. We can respond immediately to any stimuli and our memory can recall any recent events.

Psophphysiological sleep measures

Awake
Responsive immediately, can recall all events.

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Stage 1 sleep

In Stage 1 (N1) sleep the patient's mind drifts. They are easily roused to be fully alert and conscious. While in this light sleep the patient may be able to receive external stimuli such as sound and sight but memory consolidation and recall diminishes.

Psychophysiological sleep measures

Stage 1 sleep
Mind drifting,
easy to awake,
memory consolidation ceases.

<table>
<thead>
<tr>
<th>Sleep stages</th>
<th>EEG (1 second)</th>
<th>EOG (10 seconds)</th>
<th>EMG (10 seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 light (N1)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Stage 2 sleep

In Stage 2 (N2) sleep the patient's mind drifts. It becomes more difficult to wake the patient.

Psychophysiological sleep measures

Stage 2 sleep
Mind drifting,
more difficult to awake.

<table>
<thead>
<tr>
<th>Sleep stages</th>
<th>EEG (1 second)</th>
<th>EOG (10 seconds)</th>
<th>EMG (10 seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 intermediate (N2)</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
11 Sleep Stages (N3 and REM)

**Psychophysiological sleep measures**

**Stages 3 and 4 sleep**
Mind fairly blank, very difficult to awake.

<table>
<thead>
<tr>
<th>Sleep stages</th>
<th>EEG (1 second)</th>
<th>EOG (10 seconds)</th>
<th>EMG (10 seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 moderately deep (N3)</td>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
<td><img src="image3" alt="Graph" /></td>
</tr>
</tbody>
</table>

**Deep Sleep**

In stages 3 and 4 (N3) sleep the patient is sleeping deeply, their mind is blank and in this state they would be very difficult to wake. On waking the patient would feel groggy and would require some time to become fully alert. It would be unsafe for them to drive or operate machinery.

**Psychophysiological sleep measures**

**Stages 3 and 4 sleep**
Mind fairly blank, very difficult to awake.

<table>
<thead>
<tr>
<th>Sleep stages</th>
<th>EEG (1 second)</th>
<th>EOG (10 seconds)</th>
<th>EMG (10 seconds)</th>
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<tbody>
<tr>
<td>4 deep (N3)</td>
<td><img src="image4" alt="Graph" /></td>
<td><img src="image5" alt="Graph" /></td>
<td><img src="image6" alt="Graph" /></td>
</tr>
</tbody>
</table>
REM Sleep

Usually the patient will transition from Stage 3 and 4 (N3) briefly through Stage 2 (N2) and into REM sleep. They will experience vivid dreams and are easy to awaken. During REM sleep the EMG will usually flat-line as the jaw becomes slack. On waking the patient can feel fully alert after a brief period of time.

Psychophysiological sleep measures

Rapid Eye Movement sleep

Vivid dreams, sympathetic arousal, can awake feeling alert.

<table>
<thead>
<tr>
<th>Sleep stages</th>
<th>EEG (1 second)</th>
<th>EOG (10 seconds)</th>
<th>EMG (10 seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>REM</td>
<td></td>
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</table>

12 Typical sleep hypnogram

This graph (called a hypnogram) shows that the first third of the night was mostly non-REM sleep. The latter two-thirds of the night had an increasing frequency and duration of REM periods (REM is depicted as blocks).
There is a two-process model of sleep regulation that has been proposed by Borbély (1982). This model assumes that an interaction occurs between its two constituent processes:

1. homeostatic sleep drive (called Process S - as in the need for sleep) and
2. the circadian system (called Process C)

The level of Process S rises during waking and declines during sleep. Process C, which is independent of sleep and waking, modulates two thresholds which determine the onset and termination of a sleep episode.

Borbély showed how the slow wave density increases through the night and then drops off at the beginning of the day while the circadian rhythm is like a sinusoid. He proposed that the pressure to sleep was the maximum when the difference between the two was highest. The graph above highlights Process S across 24 hours and beyond.

Sleep-wake regulation

Sleep-wake regulation: 2 process model

This graph highlights Process S. It shows the relationship between the alerting signals to stay awake and the pressure to sleep. The red line indicates that process S is increasing during wakefulness. It drops shortly after 10 pm but starts to rise again upon waking (around 8 am).
**15 What is Melatonin?**

The hormone melatonin, also known as N-acetyl-5-methoxytryptamine, is primarily synthesised by the pineal gland and secreted at night in response to darkness. It helps to increase the propensity for sleepiness therefore it has a role to play in reinforcing or promoting sleep. Peak melatonin levels coincide with core body temperature minimum at a time when there is reduced alertness, mental performance and metabolic function.

Melatonin taken as a treatment for insomnia

The timing of administration of exogenous (tablet form) melatonin is critical. A great deal of patients tend to report that melatonin ‘did nothing’ for them. It is often the case that the timing and or the dose were problematic and that was the reason it was not effective. Melatonin is a hormone that synchronises the internal rhythm with the external 24 hour clock rather than being a hypnotic, and these expectations need to be reset with the patient.

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**16 Body clock**

Process C is the circadian timing system but otherwise commonly known as ‘the body clock’.

**Body Clock - circa day (diem)**

The body clock is an internal biological clock that regulates the timing for sleep in humans. The activity of this clock makes us sleepy at night and awake during the day. It is located in the **suprachiasmatic nucleus (SCN)** of the hypothalamus.

The effect of this body clock includes the following:

- Most humans have a natural day length of just over 24 hours
- The Light/dark cycle regulates the circadian rhythm.

The hormone, melatonin has been reported to have significant effects on reproduction, sleep-wake cycles and other phenomena showing circadian rhythm. Melatonin, is secreted in response to darkness. The absence of light hitting the retina is first relayed to the SCN of the hypothalamus, then to the pineal gland which secretes the hormone. Conversely bright light suppresses the production of melatonin.
17 Process C

The Body Clock, “Process C”: temperature, performance and hormones
We have many different rhythms, not just our sleep-wake system, even our cortisol levels and our level of growth hormone display a circadian rhythm.

### 18 Post lunch dip

[Graph showing daily variation in proportion of time spent asleep.]

**Average Sleep time for participants in conditions with no external cues or natural light.**

This graph shows that we are pre-programmed to feel the need for an afternoon nap. The siesta. This graph shows a group of students that were kept in a cave-like conditions and were allowed to sleep ad-lib. That is; sleep, wake, eat, play at any time that they wanted to. They were in cave-like conditions meaning that they didn't have access to external cues. They had no light/dark. They had no clocks. You will notice on the graph that without those cues they still tended to sleep at around about 11:00 pm. What is also interesting is that they all tended to sleep, on average, in the afternoon as well after lunch. This is known as the post-lunch dip, and that we have a dip in our alertness like we do at nighttime which corresponds to an increase in sleepiness and the need for sleep. Normal, healthy people have a need for a sleep in the afternoon – not just those with sleep disorders.

### 19 Melatonin levels for DSPS

You will see in these graphs that normal melatonin levels include a rise at around about 8:00pm in response to darkness. Melatonin levels in delayed sleep phase syndrome are at least two hours past this time. Often people don’t have a rise in melatonin until closer to midnight, many hours past the normal melatonin levels.

**Normal Melatonin Levels**
Advanced Sleep vs Delayed Patterns

A person who has trouble staying awake until a typical socially acceptable time, but then sleeps well could have advanced sleep phase syndrome.

**Advanced Sleep Phase Syndrome - ASPS**

Involves a shift in the major sleep episode to an earlier time relative to desired bedtime

**Sleep History**
- Sleep onset 6-8pm
- Final waking between 1-3am

**Older Age Group - Prevalence**
- 1% of middle aged adults
- Increases with increasing age
- Both genders affected equally
21 'Normal' and abnormal sleep

Here you will see a comparison between the following sleep patterns:

‘Normal’ sleep

Staying awake depends on several networks of cells in the thalamus and cerebral cortex. This picture shows the relationship between wake and sleep. But what makes us wake up in the morning and stay awake through day? There is thought to be a ‘flip-flop’ mechanism within sleep where you are either awake or asleep, like a light switch. The light is either on or off.

Within sleep the neurotransmitter Orexin is the overriding stabilizer of that switch. When Orexin is present at normal levels, we are either fully awake or fully asleep with very little time spent hovering between these two states. Another analogy is that of a see-saw. We should be either one-side down or one-side up and not spend a lot of time hovering in the middle. When the brain regulatory systems are working well, this is what happens.
Abnormal sleep

This picture depicts unstable sleep which is seen in patients with hyper-arousability. These people often feel ‘wired’ and are in a high adrenergic or high adrenal state, even when they are asleep. This instability results from partial shutting-off of the wake system within sleep. In the animation the person is predominantly asleep but with some wakefulness and this is called sleep-state instability. People with narcolepsy also get this but that is due to an Orexin deficiency, leading them to have an unstable flip-flop switch.

Unstable awake

This picture shows unstable wake conditions in which people can be awake but not in a stable state. The needle indicates wakefulness but people with unstable wake can find themselves sleeping if they are inactive or sitting quietly. This condition relates predominantly to narcolepsy where it is not uncommon to have sleep attacks and other neurodegenerative conditions such as Parkinson’s or post strokes.
22 Sleep physiology

For the most part, many physiological activities are reduced during sleep. For example, kidney function slows and the production of urine is decreased. However, some physiological processes may be maintained or even increased during sleep. For example, one of the greatest changes induced by sleep is an increase in the release of growth hormone.

Certain other activities such as cell repair and some parts of digestion are often greatest during sleep suggesting that growth and repair may be an important function of sleep.

(Photo: cheriedurbin, morgueFile)

23 Brain activity

For centuries, physicians believed that sleep was a period of brain inactivity, yet research over the last 60 years has shown us that the brain remains active during sleep. There is a progressive decrease in the activation or “firing” rate of most neurons throughout the brain as sleep progresses from wakefulness to non-REM sleep.

During REM sleep there is an increase in the firing rate of most neurons throughout the brain, as compared to non-REM sleep. In fact, the brain in REM sleep can even be more active than when we are awake. Patterns of brain activity during REM sleep are more random and variable, similar to during wakefulness. This pattern of brain activity during REM sleep probably underlies the intense dreaming that occurs during this state.
2. Changes over a lifespan

Our sleep and our sleep needs change over the lifespan

As we age and undergo a variety of developmental changes, our sleep patterns change as well.

Predicting these changes and understanding why they occur can lead to longer and more restful sleep—and better health.

1 Awakenings are normal

Awakenings are a normal part of the sleep period, even for young people. What changes as we age?

Normal sleep in older adults is lighter with more awakenings. Both of the graphs above indicate that awakenings are a normal part of sleep. The first hypnogram highlights that in a young healthy person, they usually wake up at least 3 or 4 times in the night. Most people don’t remember that they have woken as it’s for a short period of time and there is usually no distress or significance attached to the wakings.

The hypnogram for an older adult is typically an individual with no daytime sleepiness or tiredness. It shows that ‘normal’ or typical sleep in an older person is lighter and has more awakenings than the ‘normal’ sleep of a younger person.

Research has just established that between the ages of 25 and 75 years sleep need in humans decreases by 1.5 hours (8 to 6.5 hours) as well as metabolic rate and caloric need decreasing 20%.

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2 Developmental approach to sleep

Our sleep and our sleep needs change over the lifespan

At all stages of our lives, depending on our ability and opportunity to sleep, we may not always get the sleep we require. When we are healthy we have mechanisms within us to be able to ‘catch up’ on lost sleep and also to develop tolerance for acute sleep loss.

As we age and undergo a variety of developmental changes, our sleep patterns change as well. Predicting these changes and understanding why they occur can lead to longer and more restful sleep—and better health.

How much sleep do we actually need?
Adults seem to need around 7-8 hours of sleep on average. Routinely getting less than 6.5 hours per night or more than 8.5 hours of sleep per night is associated with higher morbidity and mortality. This is can vary across the lifespan.

(For further information see Harvard Healthy Sleep.)

3 Over a typical lifespan

Over a typical lifespan, the amount of time we spend each day sleeping declines. Newborns spend from 16 to 20 hours asleep each day. Between the ages of one and four, total daily sleep time decreases to about 11 or 12 hours. This gradual decline continues through childhood, such that an adolescent will need—though not necessarily get—about nine hours of sleep to function at his or her best.
4 Adults in middle age

Adults through middle age require around eight hours, although there is great variability and individual differences in what is considered normal, as mentioned earlier the optimal amount of sleep will depend on its quality and also the subjective feelings of well-being and energy in individuals.

Although some elderly people may still require up to eight hours, they may struggle to obtain those hours in one block. Many healthy older people happily get by on 6.5 hours sleep on most nights.

5 Effects of age on sleep

The percentage of the various sleep stages and amounts of awakenings, time in bed and total sleep time changes across the lifespan.

Please note the following points of interest from the graph above:

- Steady decline of deep sleep (3-4 years) from childhood
- Increase of stage 1 sleep from about 60 years age
- Gradual increase of number and length of awakenings especially from about 50 years of age
- Increase of time in bed from about 60 years
The early years of life

There are many unanswered questions in relation to the role that sleep plays in brain development. Insights into the how sleep moderates the brain during development and the consequences for behavioural and cognitive functioning will help to develop new treatment strategies and better identify children at risk.

The most rapid period of brain development in humans, coincides with the period of the most amount of sleep, especially REM sleep:

- The human brain reaches about 90% of its adults size by age 6 years of age.
- There is a general consensus that children with poor sleep patterns have adverse behavioural outcomes
- Moreover, these deficits are reversible with improvements in sleep patterns paralleling those in behavioural functioning
- There is also strong evidence that sleep quality makes a unique contribution to problematic behaviour over and above that attributable to other causes. (Kennedy, Makris, Herbert, Takahashi, & Caviness, 2002; Reiss, Abrams, Singer, Ross, & Denckla, 1996).
- There is a general consensus that children with poor sleep patterns have adverse behavioural outcomes (Minde et al., 1993; Smedje, Broman, & Hetta, 2001; Stein, Mendelsohn, Obermeyer, Amromin, & Benca, 2001; Zuckerman et al., 1987).

(Photo: greyerbaby, morguefile)
3. Role of sleep

What role does sleep play?

Included in this section are the theories of why we sleep and the consequences of poor sleep, and the social and cultural aspects of sleep.

1 Role of sleep

What does sleep actually do for humans?

Our bodies regulate sleep in much the same way that they regulate eating, drinking, and breathing. This suggests that sleep serves a similar critical role in our health and well-being.

Although it is difficult to answer the question, "Why do we sleep?" scientists have developed several theories that together may help explain why we spend a third of our lives sleeping. Understanding these theories can help deepen our appreciation of the function of sleep in our lives.

(For further information see Harvard Healthy Sleep.)

2 Inactivity theory

The inactivity theory suggests that inactivity at night is an adaptation that served a survival function by keeping organisms out of harm's way at times when they would be particularly vulnerable.

Animals that were able to stay still and quiet during these periods of vulnerability had an advantage over other animals that remained active. These animals did not have accidents during activities in the dark, for example, and were not killed by predators.

Through natural selection, this behavioural strategy presumably evolved to become what we now recognize as sleep.

Inactivity theory rebuttal

A simple counter-argument to the Inactivity theory is that it is always safer to remain conscious in order to be able to react to an emergency (even if lying still in the dark at night). Thus, there does not seem to be any advantage of being unconscious and asleep if safety is paramount.

(For further information see Harvard Healthy Sleep.)
3 Energy conservation theory

Another theory about the role of sleep is the Energy Conservation Theory.

This theory suggests that the primary function of sleep is to reduce an individual's energy demand and expenditure during part of the day or night, especially at times when it is least efficient to search for food.

Energy metabolism is significantly reduced during sleep (by as much as 10 percent in humans and even more in other species). For example, both body temperature and caloric demand decrease during sleep, as compared to wakefulness. Such evidence supports the proposition that one of the primary functions of sleep is to help organisms conserve their energy resources.

(For further information see Harvard Healthy Sleep.)

4 Restorative theory

Sleep provides an opportunity for the body to repair and rejuvenate itself.

The most striking of these is that animals deprived entirely of sleep lose all immune function and die in just a matter of weeks. This is further supported by findings that many of the major restorative functions in the body like muscle growth, tissue repair, protein synthesis, and growth hormone release occur mostly, or in some cases only during sleep.

Other rejuvenating aspects of sleep are specific to the brain and cognitive function. Sleep is sometimes thought to be a 'cooling off' period for the pre-frontal cortex. While we are awake, neurons in the brain produce adenosine, a by-product of the cells’ activities. The build up of adenosine is what is thought to make us feel tired and sleepy. Caffeine blocks the action of adenosine and this makes us feel more alert.

It is thought that this build-up of adenosine during wakefulness may promote the "drive to sleep." As long as we are awake, adenosine accumulates and remains high. During sleep the body clears itself of this accumulation of adenosine so that when we wake we are usually feeling more alert.

(For further information see Harvard Healthy Sleep.)

5 Brain Plasticity Theory

One of the most recent and compelling explanations for why we sleep is based on findings that sleep is correlated to changes in the structure and organization of the brain.

This phenomenon, known as brain plasticity, is not entirely understood, but its connection to sleep has several critical implications. It is becoming clear, for example, that sleep plays a critical role in brain development in infants and young children. This will be explored more in the next section “Developmental Approach to Sleep”.

A link between sleep and brain plasticity is becoming clear in adults as well. This is seen in the effect that sleep and sleep deprivation have on people's ability to learn and perform a variety of tasks.

(For further information see Harvard Healthy Sleep.)

6 Sleep and memory

Research suggests that sleep plays an important role in memory, both before and after learning a new task. Lack of adequate sleep affects mood, motivation, judgment, and our perception of events.

Although there are some open questions about the specific role of sleep in forming and storing memories, the general consensus is that consolidated sleep throughout a whole night is optimal for learning and memory.

(For further information see Harvard Healthy Sleep.)
7 Sleep and learning

Research suggests that sleep helps learning and memory in two distinct ways:

- A sleep-deprived person cannot focus attention optimally and therefore cannot learn efficiently.
- Sleep itself has a role in the consolidation of memory, which is essential for learning new information.

Although the exact mechanisms are not known, learning and memory are often described in terms of three functions:

1. **Acquisition** refers to the introduction of new information into the brain.
2. **Consolidation** represents the processes by which a memory becomes stable.
3. **Recall** refers to the ability to access the information (whether consciously or unconsciously) after it has been stored.

Each of these steps is necessary for proper memory function. Acquisition and recall occur only during wakefulness, but research suggests that memory consolidation takes place during sleep through the strengthening of the neural connections that form our memories.

Although there is no consensus about how sleep makes this process possible, many researchers think that specific characteristics of brainwaves during different stages of sleep are associated with the formation of particular types of memory.

(For further information see [Harvard Healthy Sleep.](#))

8 Insufficient sleep

One way to investigate the role of sleep is to look at what happens when we get insufficient sleep. Most people don’t get enough sleep.

Many people cut their sleep short in order to study, work, or have fun. However, going without adequate sleep carries with it both short-term and long-term consequences.

**Short term consequences of insufficient sleep**

In the short-term a lack of adequate sleep can affect judgment, mood, ability to learn and retain information, and may increase the risk of serious accidents and injury.

Most of our society is not getting enough sleep. The next section will outline some of the reasons for this when social and cultural factors are identified. When a person doesn’t get a good night’s sleep, it has a plethora of health and cognitive consequences.

The most obvious concerns are fatigue and cognitive focus, but mood can be greatly affected, too. A sleep disorder not only is a risk factor for subsequent development of certain mental conditions but a potential warning sign for serious
mental or medical issues. For example, sleep disturbances can signal the presence of medical and neurological problems such as congestive heart failure, osteoarthritis, and Parkinson’s disease.

9 Long-term effects

In the long term, chronic sleep deprivation may lead to a host of health problems including obesity, diabetes, cardiovascular disease, and even early mortality.

(For more information see Sleep and Disease Risk, Harvard Healthy Sleep website)
4. Social factors

Despite sleep being commonly viewed as a non-social, physiologically determined act, it is important to acknowledge that how we view sleep and our behaviours around sleep are influenced by social, cultural and historical factors.

1 Social and cultural factors in sleep

We cannot ignore the social, psychological, historical and cultural factors associated with human sleep. Despite sleep being commonly viewed as a non-social, physiologically determined act, it is important to acknowledge that how we sleep, when we sleep, where we sleep, and with whom we sleep, are all influenced by social, cultural and historical factors.

There tends to be more pressure to stay awake and keep working late into the night in our technologically advanced societies. Historically humans would have been more aligned with the light-dark cycle with their sleep-wake patterns than they are today. In this modern era in which technology allows humans to essentially eat, work, exercise and sleep at any hour of the 24 hour period, there is more tendency to give sleep a lower priority.

However, it must be acknowledged that even hundreds of years ago, shorter sleep was praised as being a sign of hard work and virtue. This quote from 1557 highlights the longstanding glorification of shorter sleep;

"Much sleep ingendereth diseases and payne, it dulles the wyt and hurteth the brayne", The School of Vertue. 1557.

2 Role models from Famous people

Historically there have been several famous people who have been notorious for their shortened sleep.

Leonardo Da Vinci       Thomas Edison       Winston Churchill
Margaret Thatcher       Ronald Reagan       Napoleon Bonaparte
Benjamin Franklin       Isaac Newton        Kevin Rudd

However, it is known that these people often had naps throughout the 24-hour period to compensate for their reduced sleep. Naps were so sacrosanct to Churchill that he kept a bed in the Houses of Parliament and believed that napping was the key to his success in leading the country.

According to Reagan’s memoirs he also napped, but tried to conceal it and he had a sense of humour about the criticism over his napping. When he was leaving office, he joked that his cabinet chair should be inscribed with, “Ronald Reagan Slept Here.”

The point is, it would be unlikely that these famous people didn’t have a cumulative amount of at least 6.5 hours of sleep per day. When people consistently get far less than 5 hours of sleep per night they would most likely need to supplement it with a nap.

A frequently asked question is “how much sleep do we need?” This is difficult to answer but involves a judgement of one’s own subjective feelings of well-being and energy on a given amount of sleep. Far more important however than the length of one’s sleep is the quality of that sleep.
Thomas Edison liked to boast that he slept only three or four hours a night, but daily napping was key to his high productivity - which he was very secretive about.

3 Social and cultural factors in sleep

Technology - it's keeping us awake for longer..
Increased consumerism keeps us up later in the form of 'late night shopping'.

With long commutes people are increasingly travelling further for work. There is a capacity to travel further with better cars, roads and trains. This means leaving home earlier and arriving home later.

Increased recreation with more social events and expectations to be more active than a generation ago keeps us up later. There can be a perception within society that 'sleep is for the weak', or the 'lazy'. Common sayings include “I'll sleep when I'm dead” or "I'm here for a good time not a long time".

(T-shirt from The Biggest Loser, TV game show, Australia 2008 & 2009)
REIN ON RUDD, 3 hours' sleep is all he needs

By Annabel Crabb

THE mystery of Kevin Rudd's impressive work rate has been solved — by his wife, Therese Rein, who reports that the Prime Minister can get by on as little as three hours' sleep a night.

In her first extended interview since the Federal Government's election, Ms Rein — herself a weekly intercity commuter, charity worker, fitness fanatic and global business owner — has described to The Age how one of the most driven partnerships in politics has adapted to life at the Lodge.

"If he wants to come home and put his tracky daks on and sit in front of the fire and have a chat, that's up to him," she says good-humouredly of her husband.

"I have my own things that I'm doing. I am both continuing to lead the company with the fabulous team of people that I work with, and then I'm doing things like going down to Whittlesea Secondary College, or hosting a UNICEF lunch on women's health. I don't need him to distract me on the ins and outs."

Ms Rein's working schedule involves three days a week spent running her business from Brisbane, with four trips a year to Britain to oversee her company's operations there.

But it is Ms Rein's revelation about her husband's working day that will provoke comment; particularly the news that the Australian Prime Minister's sleep patterns are more Spartan even than those of Napoleon Bonaparte or Margaret Thatcher, both of whom needed only four hours of sleep a night.

Mrs Thatcher trained herself to sleep for only four hours a night, in order to cope with the demands of the British prime ministership.

But Ms Rein says that Mr Rudd has only ever needed short periods of repose — three hours at a minimum — and was like that when she met him at university. "He doesn't need a lot of sleep," she says.

"It's just different."

6 Pop culture

Coffee! You can sleep when you're dead!

From this tongue-in-cheek advertisement we can see that it is not very fashionable to schedule sleep. Rather, it is better to rely on artificial stimulants such as caffeine.
7 Cultural differences

Cultural differences in sleep patterns (comparing nations)

It appears sometimes that different cultural groups have different thoughts about the sleeping patterns of the adult population and those of their children.

In some cases, cultural differences are mostly about the scheduling of sleep. For instance, in predominantly Asian countries, as well as Mediterranean countries, preschool children get less sleep at night, in that they stay up later than do kids in predominantly Caucasian countries, but they make up the shortfall by napping during the day (Mindell et al 2013).

Furthermore, a study done by the National Sleep Foundation in the USA in 2013 found that significant differences exist between the six countries surveyed (USA, Canada, Mexico, UK, Germany and Japan) regarding the elements required for a good night’s sleep, in addition to their current sleep behaviours.

8 Misconceptions about sleep

This animation shows a general public perception of what the sleep patterns of a young healthy adult would look like. Many people think that a normal sleep pattern looks like a flattened out “U” shape, in that one goes down into a deep sleep, stays there for over six hours then gradually comes up to the surface and wakes in the morning.

The reality is shown in the red line which highlights a rollercoaster series of ups and downs that occurs in normal healthy sleep across the night. The sleep period is a series of 90-minute cycles into deep and light sleep. Awakenings are a normal part of healthy sleep.
5. Classification of sleep disorders

There are two main classification systems used within the sleep disorders field to classify and make sense of the various disorders. It is recommended that Australian psychologists working with sleep disorders be familiar with both systems. This section will highlight the many disorders that are categorised within these two systems.

1 Classification of sleep disorders

There are two main classification systems used within the sleep disorders field to classify and make sense of the various disorders:
- The 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5)
- The International Classification of Sleep Disorders (ICSD)

It is recommended that Australian psychologists working with sleep disorders be familiar with both systems. It is interesting to note that most sleep disorders listed within the DSM-5 are listed in the ICSD. Some practitioners such as institutional psychologists may be required to use the ICSD codes and nomenclature.

This section will highlight the many disorders that are categorised within these two systems. Often sleep disturbances are a feature (and diagnostic criteria) of other DSM-5 disorders. There are over eighty different types of identified disorders of sleep, however the level of evidence and prevalence varies. This online course will concentrate on the most common ones seen in adult populations.

2 DSM-5 classification

In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), sleep-wake disorders encompass 10 conditions manifested by disturbed sleep and causing distress as well as impairment in daytime functioning.

The DSM-5 underscores the need for independent clinical attention of a sleep disorder regardless of mental or other medical problems that may be present.

Two previous diagnoses—sleep disorder related to another mental disorder and sleep disorder related to another medical condition—have been eliminated and greater specificity of co-existing conditions provided for each of the 10 sleep-wake disorders defined.
3 Sleep-wake disorders

The 10 sleep-wake disorders or disorder groups are:

1. insomnia disorder
2. hypersomnolence disorder
3. narcolepsy
4. breathing-related sleep disorders
5. circadian rhythm sleep-wake disorders
6. non–rapid eye movement (NREM) sleep arousal disorders
7. nightmare disorder
8. rapid eye movement (REM) sleep behaviour disorder
9. restless legs syndrome
10. substance/medication-induced sleep disorder.

Sleep disturbance can be a strong feature in a (wider) range of psychological disorders. Individuals with these disorders typically present with sleep-wake complaints of dissatisfaction regarding the quality, timing, and amount of sleep.

It is essential in terms of DSM-5 criteria that resulting daytime distress and impairment are core features shared by all of these sleep-wake disorders. For example disrupted sleep from shiftwork or lifestyle choices without associated distress isn’t a disorder under DSM-5. However it may be a health problem of another sort.

4 Insomnia Disorder

The classification of Insomnia disorder is underpinned by the patient’s subjective complaint of poor sleep. To meet this classification the patient must have difficulty falling asleep for at least 3 nights each week for 3 months or more.

According to the DSM-5, Insomnia disorder is a sleep disturbance that causes clinically significant distress or impairment in social, occupational, educational, academic, behavioural, or other important areas of functioning.

Importantly, Insomnia disorder occurs in a context where the patient has adequate opportunities for sleep. When a patient says that they have trouble sleeping, the healthcare practitioner must ascertain how much sleep is being missed.
DSM-5 Diagnostic Criteria for Insomnia Disorder

A. A predominant complaint of dissatisfaction with sleep quantity or quality associated with one (or more) of the following symptoms:

1. Difficulty initiating sleep. (In children, this may manifest as difficulty initiating sleep without caregiver intervention.)
2. Difficulty maintaining sleep, characterized by frequent awakenings or problems returning to sleep after awakenings. (In children, this may manifest as difficulty returning to sleep without caregiver intervention.)
3. Early-morning awakening with inability to return to sleep.

B. The sleep disturbance causes clinically significant distress or impairment in social, occupational, educational, academic, behavioural, or other important areas of functioning.

C. The sleep difficulty occurs at least 3 nights per week.

D. The sleep difficulty is present for at least 3 months.

E. The sleep difficulty occurs despite adequate opportunity for sleep.

F. The insomnia is not better explained by and does not occur exclusively during the course of another sleep-wake disorder (e.g., narcolepsy, a breathing-related sleep disorder, a circadian rhythm sleep-wake disorder, a parasomnia).

G. The insomnia is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication).

H. Coexisting mental disorders and medical conditions do not adequately explain the predominant complaint of insomnia.

Specify if:

With non-sleep disorder mental comorbidity, including substance use disorders
With other medical comorbidity
With other sleep disorder

Specify if:

Episodic: Symptoms last at least 1 month but less than 3 months.
Persistent: Symptoms last 3 months or longer.
Recurrent: Two (or more) episodes within the space of 1 year.

Note: Acute and short-term insomnia (i.e., symptoms lasting less than 3 months but otherwise meeting all criteria with regard to frequency, intensity, distress, and/or impairment) should be coded as another specified insomnia disorder.
### 5 Narcolepsy

**Diagnostic Criteria**

A. Recurrent periods of an irrepressible need to sleep, lapsing into sleep, or napping occurring within the same day. These must have been occurring at least three times per week over the past 3 months.

B. The presence of at least one of the following:

1. Episodes of cataplexy, defined as either (a) or (b), occurring at least a few times per month:
   
   a. In individuals with long-standing disease, brief (seconds to minutes) episodes of sudden bilateral loss of muscle tone with maintained consciousness that are precipitated by laughter or joking.
   
   b. In children or in individuals within 6 months of onset, spontaneous grimaces or jaw-opening episodes with tongue thrusting or a global hypotonia, without any obvious emotional triggers.

2. Hypocretin deficiency, as measured using cerebrospinal fluid (CSF) hypocretin-1 immunoreactivity values (less than or equal to one-third of values obtained in healthy subjects tested using the same assay, or less than or equal to 110 pg/ml).

   Low CSF levels of hypocretin-1 must not be observed in the context of acute brain injury, inflammation, or infection.

3. Nocturnal sleep polysomnography showing rapid eye movement (REM) sleep latency less than or equal to 15 minutes, or a multiple sleep latency test showing a mean sleep latency less than or equal to 8 minutes and two or more sleep-onset REM periods.

Specify whether:

- **Narcolepsy without cataplexy but with hypocretin deficiency:** Criterion B requirements of low CSF hypocretin-1 levels and positive polysomnography/multiple sleep latency test are met, but no cataplexy is present (Criterion B1 not met).

- **Narcolepsy with cataplexy but without hypocretin deficiency:** In this rare subtype (less than 5% of narcolepsy cases), Criterion B requirements of cataplexy and positive polysomnography/multiple sleep latency test are met, but CSF hypocretin-1 levels are normal (Criterion B2 not met).

- **Autosomal dominant cerebellar ataxia, deafness, and narcolepsy:** This subtype is caused by exon 21 DNA (cytosine-5)-methyltransferase-1 mutations and is characterized by late-onset (age 30-40 years) narcolepsy (with low or intermediate CSF hypocretin-1 levels), deafness, cerebellar ataxia, and eventually dementia.

- **Autosomal dominant narcolepsy, obesity, and type 2 diabetes:** Narcolepsy, obesity, and type 2 diabetes and low CSF hypocretin-1 levels have been described in rare cases and are associated with a mutation in the myelin oligodendrocyte glycoprotein gene.

- **Narcolepsy secondary to another medical condition:** This subtype is for narcolepsy that develops secondary to medical conditions that cause infectious (e.g., Whipple’s disease, sarcoidosis), traumatic, or tumoral destruction of hypocretin neurons.

Specify current severity:

- **Mild:** Infrequent cataplexy (less than once per week), need for naps only once or twice per day, and less disturbed nocturnal sleep.

- **Moderate:** Cataplexy once daily or every few days, disturbed nocturnal sleep, and need for multiple naps daily.

- **Severe:** Drug-resistant cataplexy with multiple attacks daily, nearly constant sleepiness, and disturbed nocturnal sleep (i.e., movements, insomnia, and vivid dreaming).

### Definition of terms

**Ataxia** is a non-specific clinical manifestation implying dysfunction of the parts of the nervous system that coordinate movement, such as the cerebellum. People with cerebellar ataxia may initially present with poor balance, which could be demonstrated as an inability to stand on one leg.

**Cataplexy** is a sudden and transient episode of muscle weakness accompanied by full conscious awareness, typically triggered by emotions such as laughing, crying, terror and so on. It is the main symptom of narcolepsy and is caused by an autoimmune destruction of the neurotransmitter hypocretin.

**Hypocretin** also called orexin, is a neurotransmitter that regulates arousal, wakefulness, and appetite. Cataplexy is caused by a lack of hypocretin in the brain.

**Hypotonia** is a state of low muscle tone, which is the amount of tension or resistance to stretch in a muscle, often involving reduced muscle strength. Hypotonia is not a specific medical disorder, but a potential manifestation of different diseases and disorders, such as narcolepsy, that affect motor nerve control by the brain or muscle strength.
6 Obstructive Sleep Apnoea Hypopnea

Diagnostic Criteria
A. Either (1) or (2):

1. Evidence by polysomnography of at least five obstructive apnoeas or hypopnoeas per hour of sleep and either of the following sleep symptoms:
   a. Nocturnal breathing disturbances: snoring, snorting/gasping, or breathing pauses during sleep.
   b. Daytime sleepiness, fatigue, or unrefreshing sleep despite sufficient opportunities to sleep that is not better explained by another mental disorder (including a sleep disorder) and is not attributable to another medical condition.

2. Evidence by polysomnography of 15 or more obstructive apnoeas and/or hypopnoeas per hour of sleep regardless of accompanying symptoms.

Specify current severity:
- **Mild:** Apnoea hypopnoea index is less than 15.
- **Moderate:** Apnoea hypopnoea index is 15-30.
- **Severe:** Apnoea hypopnoea index is greater than 30.

7 Circadian Rhythm Sleep-Wake Disorders

Diagnostic Criteria
A. A persistent or recurrent pattern of sleep disruption that is primarily due to an alteration of the circadian system or to a misalignment between the endogenous circadian rhythm and the sleep-wake schedule required by an individual's physical environment or social or professional schedule.

B. The sleep disruption leads to excessive sleepiness or insomnia, or both.

C. The sleep disturbance causes clinically significant distress or impairment in social, occupational, and other important areas of functioning.

Specify whether:
- **Delayed sleep phase type:** A pattern of delayed sleep onset and awakening times, with an inability to fall asleep and awaken at a desired or conventionally acceptable earlier time.
  
  Specify if:
  - **Familial:** A family history of delayed sleep phase is present.

  Specify if:
  - **Overlapping with non-24-hour sleep-wake type:** Delayed sleep phase type may overlap with another circadian rhythm sleep-wake disorder, non-24-hour sleep-wake type.

- **Advanced sleep phase type:** A pattern of advanced sleep onset and awakening times, with an inability to remain awake or asleep until the desired or conventionally acceptable later sleep or wake times.
  
  Specify if:
  - **Familial:** A family history of advanced sleep phase is present.

- **Irregular sleep-wake type:** A temporally disorganized sleep-wake pattern, such that the timing of sleep and wake periods is variable throughout the 24-hour period.

- **Non-24-hour sleep-wake type:** A pattern of sleep-wake cycles that is not synchronized to the 24-hour environment, with a consistent daily drift (usually to later and later times) of sleep onset and wake times.

- **Shift work type:** Insomnia during the major sleep period and/or excessive sleepiness (including inadvertent sleep) during the major awake period associated with a shift work schedule (i.e., requiring unconventional work hours).

- **Unspecified type**

Specify if:
- **Episodic:** Symptoms last at least 1 month but less than 3 months.
- **Persistent:** Symptoms last 3 months or longer.
- **Recurrent:** Two or more episodes occur within the space of 1 year.
8 Restless Legs Syndrome

Diagnostic Criteria
A. An urge to move the legs, usually accompanied by or in response to uncomfortable and unpleasant sensations in the legs, characterized by all of the following:

1. The urge to move the legs begins or worsens during periods of rest or inactivity.
2. The urge to move the legs is partially or totally relieved by movement.
3. The urge to move the legs is worse in the evening or at night than during the day, or occurs only in the evening or at night.

B. The symptoms in Criterion A occur at least three times per week and have persisted for at least 3 months.

C. The symptoms in Criterion A are accompanied by significant distress or impairment in social, occupational, educational, academic, behavioural, or other important areas of functioning.

D. The symptoms in Criterion A are not attributable to another mental disorder or medical condition (e.g., arthritis, leg edema, peripheral ischemia, leg cramps) and are not better explained by a behavioural condition (e.g., positional discomfort, habitual foot tapping).

E. The symptoms are not attributable to the physiological effects of a drug of abuse or medication (e.g., akathisia).

9 International Classification of Sleep Disorders

The International Classification of Sleep Disorders (ICSD), Revised Diagnostic and Coding Manual (Third Edition) is accessible online as an ebook.

It has been produced by the American Academy of Sleep Medicine in association with the European Sleep Research Society, Japanese Society of Sleep Research and the Latin American Sleep Society.

The ICSD was published with the goal of standardising definitions of sleep disorders and creating a systematic approach to diagnosis. It is widely used by clinicians and researchers worldwide due to it's specificity. Research efforts throughout the international community are improved by adhering to a recognised set of standards.

10 Goals of the ICSD

The goals of the ICSD are:

- To describe all currently recognised sleep and arousal disorders, and to base the description on scientific and clinical evidence.
- To present the sleep and arousal disorders in an overall structure that is rational and scientifically valid.
- To render the sleep and arousal disorders as compatible with ICD-9 and ICD-10 as possible.
11 Categories of the ICSD

The 8 categories of the ICSD include the following:

1. Insomnias
2. Sleep Related Breathing Disorders
3. Hypersomnias of Central Origin Not Due to a Circadian Rhythm Sleep Disorder, Sleep Related Breathing Disorder or Other Cause of Disturbed Nocturnal Sleep
4. Circadian Rhythm Sleep Disorders
5. Parasomnias
6. Sleep Related Movement Disorders
7. Isolated Symptoms, Apparent Normal Variants, and Unresolved Issues
8. Other Sleep Disorders

The diagnostic classification of sleep disorders is important because it standardizes definitions, improves awareness of the conditions, promotes a broad differential diagnosis, and facilitates a systematic diagnostic approach. In many areas of greater populations, the occurrence of sleep disorders will be higher, with more unusual presentations likely to seek help. The International Classification of Sleep Disorders (ICSD) is the most widely used classification system for sleep disorders.

12 Sleep Disorders Classification

This figure represents the overall structure of the ICSD.

- **Dyssomnias**
  - Disorders of initiating, maintaining sleep
  - Disorders of excessive sleepiness

- **Parasomnias**
  - Undesirable physical or experiential events that accompany sleep, occur during entry into sleep or during arousal from sleep

- **Secondary Sleep Disorders**
  - Disorders associated with mental, medical or neurological disorders

- **Proposed Sleep Disorders**
  - Insufficient information available to confirm definitively as a sleep disorder
6. Assessment of sleep disorders

Assessment of sleep disorders should always be done with sound clinical training and judgment. A combination of skill, experience and knowledge will aid the practitioner in making a thorough assessment of the sleep disorder. It is very common that the sleep disorder exists alongside at least one other co-morbid condition.

1 Assessment of sleep disorders

Regarding the assessment of sleep disorders it cannot be expected that a psychologist studying this program will be able to provide a definitive diagnosis for a sleep disorder such as narcolepsy. Instead it is hoped that by the end of this course but you will be able to identify cardinal signs of the most common sleep disorders and can refer the patient with a reasonable understanding of the potential sleep disorder.

Many sleep disorders are co-morbid and have components that are outside the expertise of a psychologist or may need adjunctive treatments that are not psychological in nature. If you are working with sleep clients, it is good practice to develop a local network of other health professionals to whom you can cross-refer patients to if needed.

This is particularly important as patients with sleep-related symptoms are a group most likely to come directly to psychologists from the community or their GP rather than via specialist referral. In an ideal world the approach to the assessment of sleep disorders should be multi-disciplinary.

There is evidence that many people with significant sleep concerns raise them with GPs at the last minute and there is pressure on GPs to 'fix' problems quickly and often with a prescription for a sleeping tablet. We know that sleeping problems are multi-factorial and are not likely to be 'fixed' on the spot. Sleep questions must be a routine aspect of psychological practice, (and general medical practice) as this is part of DSM-5 criteria requirements.

A number of assessment tools outlined in the ‘measurement of sleep’ section can be used in combination with a clinical interview to guide the assessment process.

2 Questions to start with

The most important guideline to aid assessment of sleep disorders is simply for health practitioners to inquire about sleep on a regular basis. This relates to all health professions including medical and psychological personnel.

Questions can be used to impart information from the patient such as their sleep duration and timing, insomnia symptoms, OSA symptoms, any parasomnia items, excessive daytime sleepiness and so on to assist in your assessment.

The following 12 questions can serve as the initial assessment regarding sleep:

1. What time do you normally go to bed at night? What time do you normally wake up in the morning?
2. Do you often have trouble falling asleep at night?
3. About how many times do you wake up at night?
4. If you do wake up during the night, do you usually have trouble falling back asleep?
5. Does your bed partner say (or are you aware) that you frequently snore, gasp for air or stop breathing?
6. Does your bed partner say (or are you aware) you kick or thrash about while asleep?
7. Are you aware that you ever walk, eat, punch, kick, or scream during sleep?
8. Are you sleepy or tired during much of the day?
9. Do you usually take 1 or more naps during the day?
10. Do you usually doze off without planning to during the day?
11. How much sleep do you need to feel alert and function well?
12. Are you currently taking any type of medication or other preparation to help you sleep?

(J Am Geriatr Soc. May 2009)
3 If symptoms are detected

If any symptoms are detected, here are some follow up questions...

- Do you have the urge to move your legs or do you experience uncomfortable sensations in your legs during rest or at night?
- Do you have to get up often to urinate during the night?
- If you nap during the day, how often and for how long?
- How much physical activity or exercise do you get daily?
- Are you exposed to natural outdoor light most days?
- What medications do you take, and at what time of day and night?
- Do you suffer any uncomfortable side effects from your medications?
- How much caffeine (eg, coffee, tea, cola) and alcohol do you consume each day/night?
- Do you often feel sad or anxious?
- Have you suffered any personal losses recently?

These questions can be seen as an extension of your current skill set or usual practice, in terms of checking for depression/anxiety and other disorders as a routine part of history taking.

4 Diagnostic algorithm

Diagnostic algorithm for sleep disorders in older persons

From Evidence-Based Recommendations for the Assessment and Management of Sleep Disorders in Older Persons (J Am Geriatr Soc., May 2009)
5 Restless Legs Syndrome

Use the following questions to detect Restless Legs Syndrome:

- Is there an urge to move the legs, and is this urge accompanied or caused by uncomfortable or unpleasant sensations in the legs?
- Do the unpleasant sensations or the urge to move begin or worsen during periods of rest or inactivity, such as sitting or lying down?
- Are the unpleasant sensations or the urge to move partially or totally relieved by movement, such as walking or stretching, for at least as long as the activity continues?
- Do the unpleasant sensations or urge to move get worse or only occur in the evening or night?

6 Obstructive Sleep Apnoea

Obstructive Sleep Apnoea (OSA) screening

Excessive Daytime Sleepiness (EDS) and a history of snoring are by far the most common presenting symptoms in most patients with OSA. Other symptoms of OSA include observed apnoea, choking or gasping on awakening, morning headache, and nocturia.

Sufferers may or may not be obese, though more commonly overweight people are susceptible to OSA. This characterization however, might not detect women with OSA as sensitively as for men.

7 Co-morbidity

Co-morbidity with other mental health issues.

In the sleep disorders field there are many conditions that share co-morbidities with mental health issues. Depression and anxiety are commonly co-morbid conditions alongside insomnia.

The relationship between insomnia and depression is far from simple, however. “Until recently, insomnia was typically seen as a symptom of depression,” says Michael L. Perlis, MD, an associate professor of psychiatry and director of the Behavioural Sleep Medicine Program at the University of Pennsylvania. “Treat the underlying depression, the thinking went, and sleep problems would go away.” We now know that it is possible for depression and anxiety to develop as a consequence of disordered sleep (particularly insomnia), not just as a symptom of the depression or anxiety.

“What we’ve come to understand is that insomnia and depression are two distinct but overlapping disorders,” says Perlis. Research shows that by treating both simultaneously, we have a better shot at improving a patient’s sleep quality, mood, and overall quality of life.

8 Prevalence of depression

There is higher prevalence of depression in people with obstructive sleep apnoea in both clinical and community samples. Many symptoms of depression and obstructive sleep apnoea overlap causing under-diagnosis of obstructive sleep apnoea in depressed patients.

Sleep problems, including obstructive sleep apnoea, are rarely assessed on a regular basis in patients with depressive disorders, but they may be responsible for antidepressant treatment failure.

(For further information see Sleep and mental health, Harvard Health Publications)
9 Associated mental health issues

With almost all sleep disorders there is an association with mental health issues.

The type of sleep disorder, its prevalence, and its impact vary by psychiatric diagnosis. But the overlap between sleep disorders and various psychiatric problems is so great that researchers have long suspected both types of problems may have common biological roots.

Studies using different methods and populations estimate that 65% to 90% of adult patients with major depression, and about 90% of children with this disorder, experience some kind of sleep problem. Most patients with depression have insomnia, but about one in five suffer from obstructive sleep apnoea.

(For further information see Sleep and mental health, Harvard Health Publications)

10 Risk of depression

Sleep problems can also increase the risk of developing depression.

A longitudinal study of about 1,000 adults ages 21 to 30 enrolled in a Michigan health maintenance organisation found that, compared with normal sleepers, those who reported a history of insomnia during an interview in 1989 were four times as likely to develop major depression by the time of a second interview three years later. And two longitudinal studies in young people — one involving 300 pairs of young twins, and another including 1,014 teenagers — found that sleep problems developed before major depression did.

Sleep problems affect more than 50% of adult patients with generalized anxiety disorder, are common in those with post-traumatic stress disorder (PTSD), and may occur in panic disorder, obsessive-compulsive disorder, and phobias. They are also common in children and adolescents. One sleep laboratory study found that youngsters with an anxiety disorder took longer to fall asleep, and slept less deeply, when compared with a control group of healthy children.

(For further information see Sleep and mental health, Harvard Health Publications)

11 Anxiety disorders

Insomnia may also be a risk factor for developing an anxiety disorder, but not as much as it is for major depression. In the longitudinal study of teenagers mentioned earlier, for example, sleep problems preceded anxiety disorders 27% of the time, while they preceded depression 69% of the time.

But insomnia can worsen the symptoms of anxiety disorders or prevent recovery. Sleep disruptions in PTSD, for example, may contribute to a retention of negative emotional memories and prevent patients from benefiting from fear-extinguishing therapies. It is important to note that treatment of a sleep disorder may improve or prevent other medical or mental health issues.

(For further information see Sleep and mental health, Harvard Health Publications)
12 Children with ADHD

Various sleep problems affect 25% to 50% of children with ADHD. Typical problems include difficulty falling asleep, shorter sleep duration, and restless slumber. The symptoms of ADHD and sleeping difficulties overlap so much it may be difficult to tease them apart. Sleep-disordered breathing affects up to 25% of children with ADHD, and restless legs syndrome or periodic limb movement disorder, which also disrupt sleep, combined affect up to 36%. And children with these sleeping disorders may become hyperactive, inattentive, and emotionally unstable — even when they do not meet the diagnostic criteria for ADHD.
7. Measurement of sleep

The most common assessment tool for measuring sleep in the medical field is the polysomnogram (or PSG).

1 Measurement of sleep

The most common assessment tool for measuring sleep in the medical field is the polysomnogram (PSG), also known as an overnight sleep study.

This is either done in a sleep clinic or in a patient’s own home with a portable PSG.

These sleep studies are very expensive, labour intensive and rely on specifically trained technicians to perform the PSG and the expertise of a sleep disorders physician to interpret and report the findings of the sleep study.

The diagram below is a humorous yet realistic situation in that the person who is already having difficulty with some aspect of their sleep is ‘wired for sound’ and not only feel restricted and somewhat uncomfortable, but they also can feel self-conscious and anxious and vulnerable having their sleep observed.

2 Polysomnography

Polysomnography (PSG) is the term for overnight sleep study (in the laboratory or at home).
PSG Channels

There are usually at least 12 channels of information this means at least 20 wires or probes. EEG, EMG, EOG, ECG, SaO₂, airflow, respiratory and abdominal bands, snoring and more are used to look at the overall clinical picture of one's sleep.

3 Wrist actigraphy

Actigraphy is the continuous recording of body (often wrist) movement by means of a body-worn device that detects movement. This small device is worn on the dominant wrist and the internal algorithm detects movement and rest differently and can differentiate sleep from just lying still awake. In this diagram the blue sections indicate the sleep periods and the black parts indicate movement. In most cases the data from wrist actigraphy correlates well with self-report and sleep diary of the patient.

Because sleep and wakefulness differ from each other by the amount of body movement, it has been claimed that the two states can be accurately distinguished by actigraphy.

This method of sleep measurement is best to be used with sleep diaries. With the rise of wearable technology with accelerometers such as fitness watches, wrist actigraphy is now becoming an affordable means of measuring sleep.
4 Sleep Diaries/Raster plots

Graphical style sleep diaries (or raster plots) can be used and are essential for picking up circadian rhythm disturbance. Table style sleep diaries can also be used.

It is essential to have at least 2 weeks of baseline sleep diary information prior to treatment. It is also a good idea to have your client fill out a sleep diary at the end of treatment to measure progress and outcome expectancies.
5 Measurement of sleep

Other common measurement and assessment tools also include the following:

- The Epworth Sleepiness Scale
- The Insomnia Severity Index
- The Pittsburgh Sleep Quality Index
- Daytime Feeling and Functioning Scale
- Dysfunctional beliefs and attitudes about sleep (DBAS)

6 Epworth Sleepiness Scale

To assess daytime functioning the practitioner may ask the client some simple questions. An example would be to ask: "Do you experience daytime sleepiness?"

If the answer is yes then sleep apnoea or narcolepsy may be present. People reporting some form of insomnia are usually not sleepy.

"Do you experience fatigue or emotional distress?"

If the answer is yes then this is a symptom that occurs usually with insomnia.

Questions can determine the client's attitudes about sleep and the effects of poor sleep. The patient may be adamant that they "need a solid 8 hours sleep".

The Epworth Sleepiness Scale can be used to determine if the client is getting adequate sleep.
When the scale is completed the client is urged to see a sleep specialist if their score is 11 and above.
### INSOMNIA SEVERITY INDEX

1. Please rate the current severity of your insomnia problems

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty falling asleep</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Difficulty staying asleep</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Problem waking up too early</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

2. How satisfied/dissatisfied are you with your current sleep pattern?

<table>
<thead>
<tr>
<th></th>
<th>Very Satisfied</th>
<th>Moderately Satisfied</th>
<th>Very Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

3. To what extent do you consider your sleep problem to interfere with your daily functioning (e.g., daytime fatigue, ability to work/daily chores, concentration, memory, mood, etc.)?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

4. How noticeable to others do you think your sleeping problem is in terms of impairing the quality of your life?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

5. How concerned are you about your current sleep problem?

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>Much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
6. To what extent do you believe the following factors are contributing to your sleep problem?

<table>
<thead>
<tr>
<th>Factor</th>
<th>None</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Very Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Racing thoughts at night</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Muscular tension/pain</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Bad sleeping habits</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Natural aging process</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

7. After a poor night’s sleep, which of the following problems do you experience on the next day? Please circle all those that apply.
   a. Daytime fatigue: tired, exhausted, washed out, sleepy
   b. Difficulty functioning: performance impairment at work/daily chores. Difficulty concentrating, memory problems
   c. Mood problems, irritable, tense, nervous, groggy, depressed, anxious, grouchy, hostile, angry, confused
   d. Physical symptoms: muscle aches/pains, light-headed, head-ache, nausea, heartburn, muscle tension
   e. None

**Total score categories:**

- A client with a score between 0 and 7 has no clinically significant insomnia
- A patient who has a score of 8 to 14 has sub-threshold insomnia
- A person who gets a score of 15 to 21 has moderately severe clinical insomnia
- A patient who has a score between 22 and 28 has severe clinical insomnia.

(PDF version of the Insomnia Severity Index)
8 Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI) can be downloaded from the University of Pittsburgh Sleep Medicine Institute website. Documentation is available for download with the instrument including a supporting article, instructions for scoring and a database.

Subject's Initials_________________ID#_________________Date______________Time_____AM

PITTSBURGH SLEEP QUALITY INDEX

INSTRUCTIONS:
The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night?

   BED TIME ____________

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

   NUMBER OF MINUTES ____________

3. During the past month, what time have you usually gotten up in the morning?

   GETTING UP TIME ____________

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

   HOURS OF SLEEP PER NIGHT ____________

For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you . . .

   a) Cannot get to sleep within 30 minutes

      Not during the past month____ Less than once a week____ a week____ times a week____

   b) Wake up in the middle of the night or early morning

      Not during the past month____ Less than once a week____ a week____ times a week____

   c) Have to get up to use the bathroom

      Not during the past month____ Less than once a week____ a week____ times a week____
d) Cannot breathe comfortably
   Not during the past month____  Less than once a week____  Once or twice a week____  Three or more times a week____

e) Cough or snore loudly
   Not during the past month____  Less than once a week____  Once or twice a week____  Three or more times a week____

f) Feel too cold
   Not during the past month____  Less than once a week____  Once or twice a week____  Three or more times a week____

g) Feel too hot
   Not during the past month____  Less than once a week____  Once or twice a week____  Three or more times a week____

h) Had bad dreams
   Not during the past month____  Less than once a week____  Once or twice a week____  Three or more times a week____

i) Have pain
   Not during the past month____  Less than once a week____  Once or twice a week____  Three or more times a week____

j) Other reason(s), please describe______________________________

How often during the past month have you had trouble sleeping because of this?
   Not during the past month____  Less than once a week____  Once or twice a week____  Three or more times a week____

6. During the past month, how would you rate your sleep quality overall?
   Very good __________
   Fairly good __________
   Fairly bad __________
   Very bad __________
7. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

Not during the past month   Less than once a week   Once or twice a week   Three or more times a week

8. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

Not during the past month   Less than once a week   Once or twice a week   Three or more times a week

9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all

Only a very slight problem

Somewhat of a problem

A very big problem

10. Do you have a bed partner or room mate?

No bed partner or room mate

Partner/room mate in other room

Partner in same room, but not same bed

Partner in same bed

If you have a room mate or bed partner, ask him/her how often in the past month you have had . . .

a) Loud snoring

Not during the past month   Less than once a week   Once or twice a week   Three or more times a week

b) Long pauses between breaths while asleep

Not during the past month   Less than once a week   Once or twice a week   Three or more times a week

c) Legs twitching or jerking while you sleep

Not during the past month   Less than once a week   Once or twice a week   Three or more times a week
d) Episodes of disorientation or confusion during sleep

<table>
<thead>
<tr>
<th>Not during the past month</th>
<th>Less than once a week</th>
<th>Once or twice a week</th>
<th>Three or more times a week</th>
</tr>
</thead>
</table>

e) Other restlessness while you sleep; please describe

| Not during the past month | Less than once a week | Once or twice a week | Three or more times a week |
9 Daytime feeling
Daytime Feeling and Functioning Scale
Normal Mean = 7 (4)
Insomnia Mean = 14 (6)

Daytime Feeling and Functioning Scale

We would like to know how you are feeling and functioning during the day.
Please indicate how frequently across the past two weeks you have: (tick one box for each statement)

<table>
<thead>
<tr>
<th></th>
<th>Never or seldom</th>
<th>Occasionally</th>
<th>Often</th>
<th>Frequently or Almost all the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Felt lethargic</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>2. Felt irritable</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>3. Lacked motivation</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>4. Been unable to concentrate</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>5. Had trouble with poor memory</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>6. Felt fatigued</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>7. Had difficulty accomplishing daytime tasks</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>8. Found it difficult to enjoy social interactions</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>9. Felt generally ill</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>10. Felt you had a reduced quality of life</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>11. Found it difficult to organise your thoughts</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>12. Felt depressed</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

10 Dysfunctional beliefs

Dysfunctional beliefs and attitudes about sleep (DBAS)
The DBAS scale evaluates sleep-related beliefs, querying respondents’ expectations and attitudes regarding the causes, consequences, and potential treatments of sleep issues. The scale may be particularly valuable in the formation of cognitive approaches to treatment. Identifying and targeting disordered cognitions about sleep may help to improve intervention outcomes.

The DBAS 16 item version has 4 factors:

1. perceived consequences of insomnia
2. worry/helplessness about insomnia
3. sleep expectations
4. medication

The scale does not have norms and cut offs but can instead be used as a baseline measure to help identify main areas of cognitive concern and also at the end of treatment to monitor progress in these domains.
**Dysfunctional Beliefs About Sleep Scale**

Please indicate to what extent you personally agree or disagree with each statement by circling a number that indicates where your personal rating falls.

1. I need 8 hours of sleep to feel refreshed and function well during the day.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

2. When I don’t get the proper amount of sleep on a given night, I need to catch up on the next day by napping or on the next night by sleeping longer.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

3. I am concerned that chronic insomnia may have serious consequences on my physical health.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

4. I am worried that I may lose control over my ability to sleep.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

5. After a poor night’s sleep, I know that it will interfere with my daily activities on the next day.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

6. In order to be alert and function well during the day, I am better off taking a sleeping pill rather than having a poor night’s sleep.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

7. When I feel irritated, depressed, or anxious during the day, it is mostly because I did not sleep well the night before.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

8. When I sleep poorly on one night, I know it will disturb my sleep schedule for the whole week.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

9. Without an adequate night’s sleep, I can hardly function the next day.
   - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

10. I can’t ever predict whether I’ll have a good night’s sleep.
    - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

11. I have little ability to manage the negative consequences of disturbed sleep.
    - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

12. When I feel tired, have no energy, or just seem not to function well during the day, it is generally because I did not sleep well the night before.
    - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

13. I believe insomnia is essentially the result of a chemical imbalance.
    - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

14. I feel insomnia is ruining my ability to enjoy life and prevents me from doing what I want.
    - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

15. A “nightcap” before bedtime is a good solution to sleeplessness.
    - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

16. It usually shows in my physical appearance when I haven’t slept well.
    - Strongly Disagree 1 2 3 4 5 6 7 8 9 10 Strongly Agree

8. Healthy sleep practices

This book will focus on healthy sleep practices.

1 What is sleep hygiene?

A term commonly used in the sleep literature and particularly amongst psychologists is the term ‘sleep hygiene’. It was first coined in 1977 by PJ Hauri and it has been used ever since to describe attempts to match a patient with his/her environmental, psychological and physiological factors which are aimed at improving sleep. We'll be referring to these as “Healthy Sleep Practices”.

There is limited evidence that sleep hygiene on its own is useful but these practices are an essential part of any treatment plan. They are not just relevant to clients with insomnia, they are important to Obstructive Sleep Apnoea (OSA), Restless Legs Syndrome (RLS) and parasomnias too.

Psychologists often report knowledge of sleep hygiene but not of any other aspects of improving their clients’ sleep health. It can be challenging getting clients to reduce caffeine, nicotine and alcohol, this advice must be handled delicately. Motivational Interviewing techniques could be utilised as well as knowledge of the Stages of Change model.

2 Healthy sleep practices

Sleep hygiene is a variety of different practices that are necessary to have normal, quality nighttime sleep and full daytime alertness.

The most important sleep hygiene measure is to maintain a regular wake schedule and to minimise caffeine, alcohol, nicotine and other stimulants.

It is also important to spend an appropriate amount of time in bed, not too little, or too excessive. This may vary by individual; for example, if someone has a problem with daytime sleepiness, they should spend a minimum of eight hours in bed, if they have difficulty sleeping at night, they should limit themselves to 7 hours in bed in order to keep the sleep pattern consolidated. These are just approximate recommendations and will vary according to the client and their sleep diary and self-reports.

Healthy Sleep Practices:

1. Curtail time in bed to match sleep time
2. Take the “trying” out of sleep
3. Eliminate the bedroom clock
4. Ensure regular physical exercise either in morning, daytime or evening, but not too late at night
5. Avoid caffeine, alcohol & nicotine
6. Regularise bedtimes
7. Avoid being too full or too hungry when attempting to sleep
8. Explore napping - short naps of 20-30 minutes could be useful but avoid long naps, especially later than 3pm
9. Role of hypnotics - sleeping tablets can have benefit short-term and should be discussed with GP
10. Turn off ‘screens’ at least 1 hour before sleep time
11. Ensure the bedroom is not too hot or too cold
12. Ensure adequate exposure to natural light during waking hours
3. Sleep restriction therapy

There is a natural tendency amongst individuals with insomnia to increase the amount of time spent in bed in an effort to maximise their opportunity for more sleep. However this tendency is more likely to result in fragmented or poor-quality sleep. So, to counter this tendency sleep restriction (which is one of the most important elements of CBT-i) was developed to encourage the poor sleeper to curtail the amount of time spent in bed to the actual amount of sleep time.

This technique was originally coined “sleep restriction” but has more recently become known as “bed restriction” or “sleep consolidation”. The latter terms are an attempt to avoid the perception of ‘restricting’ sleep any further than it already is in individual’s with insomnia. This technique is not aimed at further reducing or restricting sleep but rather it is aimed at increasing sleep drive and reducing time in bed lying awake.

The aim is to limit the time in bed to match the patient’s average reported actual sleep time, usually based on the sleep diary data. Usually a ‘window’ for sleep opportunity is set as a collaborative effort between client and practitioner. Gradually more time in bed is allowed as sleep improves. The concept is to set a strict bedtime and rising schedule, limited to average expected hours of sleep reported in the average night. The aim is to increase time in bed by 15–30 minutes when the time spent asleep is at least 85% of the allowed time in bed. This is known as the sleep efficiency (SE).

4 Caffeine, alcohol & nicotine

Caffeine

This list includes:
- Brewed coffee
- 250mls Cola
- Strong Tea
- Energy drinks
- Chocolate bars

The effects of these last between 3-5 hours, however it takes 8 hours for the caffeine to be eliminated from body.

Nicotine

It takes 2-3 hours for the effects of nicotine to wear off. In some cases the smoker may be woken by internal bodily processes by an urge for another cigarette!

Alcohol

If taken in the early part of a night alcohol helps sleep onset. For this reason people may resort to drinking alcohol as a form of relaxation. The relaxed effect however wears off after 3 to 5 hours.

In the second latter part of the night the alcohol tends to fragment sleep with fewer opportunities for the sleeper to enter deeper sleep stages. By staying in lighter sleep stages the sleeper experiences more dreaming.

For more effective sleep it is advised that the intake of caffeine and nicotine can be reduced gradually whereas the intake of the alcohol should be curtailed.

My Doctor said “Only 1 glass of alcohol a day”. I can live with that.
5 Using technology

Research has shown that two hours of computer/device use at maximum brightness was enough to suppress people's normal nighttime release of melatonin, a key hormone in the body's clock, or circadian system.

Turn down the brightness of your glowing screens before bed - or read printed materials instead. Goggles/special glasses can be used to reduce the impact of the bright light - it can prevent the suppression of melatonin. It is recommended that people have an hour or so prior to attempting sleep onset without being in front of electronic screens.

6 Exercise

If exercise is too vigorous and too late in the evening it could raise your core body temperature to the point at which it could interfere with your sleep/wake system. As our sleep hormones get ready to induce sleep, the core body temperature drops as the levels of the hormone melatonin rise to induce a propensity for sleepiness.

If the body temperature is raised and doesn’t drop on cue, the induction of sleep can be delayed. However, there is now evidence to show that exercise, even if it is late in the evening, is better than none at all.
7 Motivational interviewing

In order to have more chance of being an effective therapist, and in order for the client to have increased self-efficacy of undertaking the challenge of reducing caffeine or alcohol, then Motivational Interviewing (MI) would be a useful skill to use.

MI is considered to be a major tool in terms of individual level health promotion. It can help guide the practitioner about how best to help people change/modify their health practices. It is particularly useful when the client is resistant or ambivalent.

8 Ready, willing and able

Miller and Rollnick’s work is based on this phrase: “Ready, willing and able!”.

This phrase is a good tool to ascertain the client’s level of enthusiasm for changing poor habits:

- Is change an immediate priority for the client? (readiness)
- What is the importance of change for the client? (willingness)
- Does the client have the confidence to change? (ability)

**RULE**

The word RULE is a useful mnemonic to draw upon when implementing the spirit of MI.

It stands for:

- Resist the fighting reflex
- Understand your patients’ motivations
- Listen with empathy
- Empower your patient.

9 Principles of MI

Motivational interviewing consists of 5 main principles:

1. roll with resistance
2. express empathy
3. avoid argumentation
4. develop discrepancies
5. support self-efficacy
10 Client ambivalence

One of the biggest challenges that health practitioners face is helping people change longstanding behaviours that pose significant health risks.

When patients receive compelling advice to adopt a healthier lifestyle by cutting back or ceasing harmful behaviours (e.g. smoking, caffeine or heavy drinking) or adopting healthy or safe behaviours, and ignore that advice then it can be frustrating and bewildering for the practitioner.

A natural response for a practitioner who encounters such opposition (termed ‘resistance’ in the psychological literature) is to reiterate health advice with greater authority or to adopt a more coercive style in order to educate the patient about the imminent health risks if they don’t change.

When these strategies don’t succeed, the practitioner may characterise the patient as ‘unmotivated’ or ‘lacking insight’.

11 Stages of Change model

Research around behaviour change shows that motivation is a dynamic state that can be influenced, and that it fluctuates in response to a practitioner’s style.

Importantly, an authoritative or paternalistic therapeutic style may in fact deter change by increasing resistance.

The Stages of Change Model (or Transtheoretical Model)

This model was developed by Prochaska and DiClemente (1984)

- It emphasises “readiness to change” as the principal factor underlying adoption of a new health behaviour.
- It was developed to explain change in psychotherapy but has been applied to many health behaviours.
- It has been used a lot in smoking cessation and other drug and alcohol work so lends itself nicely to reducing caffeine and alcohol, or sleeping tablets in the sleep field.

This model has two dimensions:

1. Stages of change
2. Process of change

12 Dimensions of model

Processes of change

Different strategies used at different phase or stage

- Pre-contemplation - consciousness raising. At this stage the client has no intention of changing
- Contemplation - self-re-evaluation. The client is thinking about change
- Preparation - getting ready to take action. The person has made a decision to change and is planning prior to taking action.
- Action phase - making change. The person is involved in changing the behaviour
- Maintenance - contingency management (reinforcement). The person has been successful in maintaining change
- Relapse - should be included as a stage, as it is almost an expected part of the process.
13 Altering sleep practices

It is important to bring both the Stages of Change model and Motivational Interviewing into the implementation and application of attempting to help clients alter their sleep practices.

Clients will resist if advice is given too insensitively or too authoritatively. There will be little chance of adopting a particular healthy sleep practice if the client is not intending to change their current behaviour.

Motivational interviewing is useful for increasing the client’s motivation to change and overcoming ambivalence or resistance. This technique will help to move the client through the stages from precontemplation, where there is no intention to change, through to the maintenance phase where the patient can maintain the changed behaviour. MI will help the patient to transition between the different stages including the very likely relapses.
9. Treatment principles

The treatment of sleep disorders should be undertaken with a multi-factorial, multi-disciplinary approach and with a healthy awareness within the practitioner that there is often co-morbidity.

1 Major disorders

<table>
<thead>
<tr>
<th>Common Sleep Disorder</th>
<th>Recommended evidence-based treatment options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insomnia disorder</td>
<td>CBT for insomnia (CBT-i), Mindfulness + CBT-I, relaxation techniques, adopting healthy sleep practices. Focus is on minimising emotional, cognitive and physiological ‘arousal’</td>
</tr>
<tr>
<td>Obstructive Sleep Apnoea (OSA)</td>
<td>CPAP therapy, surgery, weight loss. Focus on keeping the airway more open and more patent during sleep to prevent periods of absence of breathing</td>
</tr>
<tr>
<td>Restless Legs Syndrome</td>
<td>Medications, check iron status (common to need iron supplements) focus is on keeping limbs still during sleep</td>
</tr>
<tr>
<td>Parasomnia</td>
<td>Focus on minimizing hyperarousal and overstimulation from stress, heat, diet, alcohol, caffeine</td>
</tr>
<tr>
<td>Delayed Sleep Phase Syndrome</td>
<td>Use of appropriately timed bright light therapy plus or minus exogenous melatonin (tablet). Chronotherapy- focus is to realign rhythm to more socially acceptable phase/timing</td>
</tr>
</tbody>
</table>

2 Practitioner attitudes

When treating a patient with a sleep disorder it is important to convey hope and support but rarely is there a quick fix in any area in the sleep field.

Causes and triggers are multi-factorial and the guiding principles suggest looking at the presenting issues as well as the pre-disposing, precipitating and perpetuating issues. In essence the Spielman model outlined below is the way in which all sleep disorders are treated, not just insomnia.

Spielman’s model highlights major principles for all sleep conditions.
3 Treatment phases

A good psychological treatment principle for sleep disorders is the concept of treatment phases:

**Acute/Induction**
The objective is to get symptoms under control (may need co-management with drugs at this time, particularly if acute distress as psychology strategies take time to work).

**Consolidation**
Hone the patient’s self-management skills

**Maintenance**
Have the client understand what is needed to maintain effects over time

**Relapse treatment**
Outline / equip them with an action plan to put skills learnt during phases 1 and 2 back in to place more strictly/tightly

Phase 4, Relapse treatment, also helps to re-enforces that this treatment is ‘not a quick fix’. The treatment in fact is not really finished once acute symptoms start to settle - that’s only phase 1 - but often when patient feels that the work is done.

It is important to remember that it takes time for psychology treatments to work, so the client/practitioner relationship needs to have trust with good engagement.

4 Long-term approach

It is important to see the client/patient over a certain number of sessions and to follow up treatment and set a review appointment some months ahead in which longer term outcomes can be monitored.

Some conditions may be seasonal or be exacerbated by seasonal changes so it’s essential to have follow-up to allow for these variations.

A multi-disciplinary approach is probably the most important treatment principle.

5 Code of ethics

The APS Code of Ethics will guide treatment principles as ethics will undoubtedly influence professional practice.

This code has been developed to promote sound professional practice in order to safeguard the welfare of consumers of psychological services, and the integrity of the profession. Specifically the General Principle 2 (Competence) is highly relevant to this course and the manner in which a psychologist will approach the treatment of the client with a presenting sleep disorder.

**B.1. Competence**

**B.1.1.** Psychologists bring and maintain appropriate skills and learning to their areas of professional practice.

**B.1.2.** Psychologists only provide psychological services within the boundaries of their professional competence. This includes, but is not restricted to:

(a) working within the limits of their education, training, supervised experience and appropriate professional experience;
(b) basing their service on the established knowledge of the discipline and profession of psychology;
...
(e) ensuring that their emotional, mental, and physical state does not impair their ability to provide a competent psychological service.

**C.2. Communication**

**C.2.1.** Psychologists communicate honestly in the context of their psychological work.
6 Client expectations

Resetting client expectations

There are many myths associated with the sleep field and a great deal of the time much of our work focuses on the resetting of client expectations. Unlike many other areas in health, in sleep, there are strongly held views about sleep that are based on cultural, spiritual and societal beliefs rather than science or knowledge. This makes education and resetting expectation of much greater importance in the area of sleep than it does for other areas of health.

To mention just a few:

- **Most people feel that they need 8 hours of sleep each night**
  Clients are dissatisfied with less sleep because they know about the general recommendation to sleep 8 hours each night. It is essential that they know that 8 hours is merely an average.

- **People often feel they need to get 8 hours of solid sleep in one block with no wakings and no light patches**
  This is simply not the pattern of a normal sleep period.

- **Most people feel that napping is not a good idea**
  Many clients fear that it will interfere with their sleeping patterns, or that it is deemed lazy or only for the elderly. Napping can be beneficial and if managed well (short naps, completed 8 hours or so before the major sleep period) they shouldn’t be a problem.

- **Most people glorify famous night owls such as Maggie Thatcher and Winston Churchill**
  Many of these people slept during the day or napped often throughout the 24 hour period to make up their sleep debt. These people were not always healthy, good role models, or able to regulate their mood.

- **Clients may have an expectation that a return to normal sleep habits will remove the dark rings under their eyes**
  Often these dark rings are caused by food allergies or other factors and not a lack of sleep.

- **Often people drink alcohol to improve their sleep instead of ‘being hooked on sleeping tablets’**
  The reality of that is that the prescribed and monitored sleeping pill will do less harm than the alcohol.

- Other client expectation re-setting is around alcohol and other substances and their negative effect on sleep.

7 Course Conclusion

This concludes the instructional materials for this introduction to sleep psychology. We hope that you found the content of this course engaging and relevant to the clients that you may interact with in future.

The course developers through this instruction have sought to make course participants aware of the underlying physiology of sleep including how our sleep changes across our lifespan. While many people are aware of the need to sleep this course also looked at the proposed theories for why we sleep, the health consequences of poor sleep and of the social and cultural factors surrounding sleep.

Participants were introduced to the classification systems used within the sleep field and the diagnostic criteria for the major sleep disorders, including insomnia, obstructive sleep apnoea, restless legs syndrome, narcolepsy and Delayed Sleep Phase Syndrome (DSPS). These instructional materials also covered the ways in which sleep disorders can be assessed and how sleep can be measured.

As a practitioner the psychologist may very likely encounter clients where there is comorbidity with sleep disorders. To assist course participants in the treatment of their clients the instructional materials incorporated healthy sleep practices and the treatment principles surrounding the management of sleep disorders. The materials also gave an introduction on how to bring ‘sleep hygiene’ into treatment plans.

This course will conclude with an open book final assessment to check your understanding of the subject matter.

On behalf of the APS Institute and the Australasian Sleep Association, thank you for your participation. We wish you well in your practice, and success in your diagnosis and treatment of clients who suffer greatly from sleep disorders.
8 References

Healthy Sleep Harvard website [http://healthysleep.med.harvard.edu](http://healthysleep.med.harvard.edu)
Sleep Health Foundation [http://www.sleephealthfoundation.org.au](http://www.sleephealthfoundation.org.au)

**Book 9 questions**