

Sleep Matters

The impact of sleep
on health and wellbeing
Mental Health
Awareness Week 2011

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**‘The main facts in
human life are five:
birth, food, sleep,
love and death.’**

E. M. Forster

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We spend approximately a third of our lives asleep. Sleep is an essential and involuntary process, without which we cannot function effectively. It is as important to our bodies as eating, drinking and breathing, and is vital for maintaining good mental and physical health. Sleeping helps to repair and restore our brains, not just our bodies.

During sleep we can process information, consolidate memories, and undergo a number of maintenance processes that help us to function during the daytime. Sleep is crucial to the health of individuals within the UK and to the public health of the UK population.

We all need to make sure we get the right amount of sleep, and enough good quality sleep. There is no set amount of sleep that is appropriate for everyone; some people need more sleep than others. Our ability to sleep is controlled by how sleepy we feel and our sleep pattern. How sleepy we feel relates to our drive to sleep. The sleep pattern relates to the regularity and timing of our sleep habits; if we have got into a pattern of sleeping at set times then we will be able to establish a better routine, and will find it easier to sleep at that time every day.

Sleep is a more complex process than many people realise, much of it is still a mystery to scientists. During sleep, the body goes through a variety of processes and sleep stages. Good quality sleep is likely to be the result of spending enough time in all of the stages, including enough deep sleep which helps us feel refreshed.

Poor sleep over a sustained period leads to a number of problems which are immediately recognisable, including fatigue, sleepiness, poor concentration, lapses in memory, and irritability.

Up to one third of the population may suffer from insomnia (lack of sleep or poor quality sleep). This can affect mood, energy and concentration levels, our relationships, and our ability to stay awake and function during the day.

Sleep and health are strongly related, poor sleep can increase the risk of having poor health, and poor health can make it harder to sleep. Common mental health problems like anxiety and depression can often underpin sleep problems. Where this is the case, a combination approach to treating the mental health problem and sleep problem in tandem is often the most effective.

It is essential for us to better understand the sleep process in order to ensure that we get a regular amount of good quality sleep. Sleepio, co-founded by Professor Colin Espie, Director of the University of Glasgow Sleep Centre, is a new organisation that is dedicated to raising awareness of the importance of sleep. Sleepio collected data from a large-scale, national survey on sleep habits; some of these revealing new data appear throughout this report.

We can all benefit from improving the quality of our sleep. For many of us, it may simply be a case of making small lifestyle or attitude adjustments in order to help us sleep better. For those with insomnia it is usually necessary to seek more specialist treatment. Sleep medication is commonly used, but may have negative side effects and is not recommended in the long-term. Psychological approaches are useful for people with long-term insomnia because they can encourage us to establish good sleep patterns, and to develop a healthy, positive mental outlook about sleep, as well as dealing with worrying thoughts towards sleeping.

One of the most widely used and successful therapies is Cognitive Behavioural Therapy (CBT). This is useful even for people who have had insomnia for a long period of time. A full course of such a therapy with a sleep specialist is potentially costly, and is most appropriate for people with severe sleep problems. Still, some CBT principles can be appropriate and easily practiced for anyone who is experiencing a sleepless night.

Key points:

- Sleeping poorly increases the risk of having poor mental health. In the same way that healthy diet and exercise can help to improve our mental health, so can sleep.
- There is no universal answer to the question of how much sleep a person needs. This varies from person to person. What is important is that people find out how much sleep they need and ensure that they achieve this.
- The consequences of poor sleep should be taken seriously in healthcare, education, family life, and society at large.

We recommend that:

- The importance and benefits of sleep for both mental and physical health should be highlighted in national and local public health campaigns, including in schools and workplaces. New and easily accessible resources should be made available advising people on what they can do themselves to improve their sleep.
- The Royal College of GPs should provide up to date, evidence-based training and information for its members on the importance and benefits of sleep for physical and mental health. GPs should also have access to a diagnostic tool for use in recognising sleep problems in primary care settings.

- The new Public Health Outcomes Framework should include a specific outcome on reducing sleep problems across the whole population. Sleep should also be reflected in new national mental health outcome indicators, including improving sleep for people who experience significant sleep problems requiring specialist help.
- The National Institute of Health and Clinical Excellence (NICE) should develop guidance for the management of insomnia using non-pharmacological therapies, to complement existing guidance on using pharmacological therapies.
- People with sleep problems should be recognised within the Improving Access to Psychological Therapies (IAPT) programme, especially regarding access to Cognitive Behavioural Therapy (CBT). IAPT staff should be suitably trained on sleep issues.
- Further research should be carried out to establish the effectiveness of low cost, non-intrusive CBT-based interventions for sleep problems, such as self-help books and online courses.

sleep

**‘Sleep is the best
meditation.’**

Dalai Lama

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Introduction

We spend, on average, approximately a third of our life asleep. Along with eating, drinking and breathing, sleeping is one of the pillars for maintaining good mental and physical health. Ultimately, we would die if we did not sleep.

Despite its obvious importance, sleep remains a mysterious realm that has fascinated us for thousands of years. For example, in the Greek pantheon sleep is represented by the winged god Hypnos, himself the son of Nyx, goddess of the Night. Closely related to Hypnos were Thanatos (god of death) and Morpheus (god of dreams). As human beings, most of us cross the bridge between the conscious to the unconscious on at least a daily basis. Yet, we seldom give a second thought to the countless physiological and psychological processes that occur within our bodies and brains when we are deep in slumber.

The aim of this report is to raise awareness about the importance of sleep and its crucial role for our health, both physical and mental, just like diet and exercise. In Part I of this report, we provide information about sleep, why we need to sleep, and what happens during sleep.

In Part II, we review the literature on sleep problems and explain what can happen if we don't sleep properly. In Part III, we describe ways in which we can improve our sleep and explain possible treatments for those who find achieving good quality sleep difficult. The primary focus of this report is sleep and mental health; both how mental health can affect our sleep, and how sleep can affect our mental health.

The report includes primary data from the Great British Sleep Survey, developed by Professor Colin Espie at the University of Glasgow in association with Sleepio Ltd.

The survey has been available online from March 2010, and aimed to take a snapshot of the UK's sleep habits. By December 2010, there had been 6708 responses to the survey. This survey is still online: you can take part by visiting the Sleepio website, www.sleepio.com.

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**‘A good laugh and
a long sleep are
the best cures in
the doctor’s book.’**

Irish proverb

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Part 01

Sleeping and Sleep Patterns

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The first part of this report describes the sleep process in detail, providing information about how and why it is essential to maintain good quality sleep throughout our lives, and on the problems that can arise during sleep.

What is Sleep?

Sleep is often seen as time when the body is inactive. In fact, the opposite is true. Sleep is an active, essential and involuntary process, without which we cannot function effectively. Sleep is not a lifestyle choice; just like breathing, eating or drinking, it is a necessity.

Sleep is a complex process during which our body undertakes a number of essential activities. It involves low awareness of the outside world, relaxed muscles, and a raised anabolic state which helps us to build and repair our bodies.

Primarily, sleep is for the brain, allowing it to recover and regenerate. During our sleep, the brain can process information, consolidate memory, and enable us to learn and function effectively during daytime⁰¹. This is why we are encouraged to get a good night's sleep in the run up to a job interview or exam rather than staying awake all night to prepare.

Whilst we sleep, our brain is not only strengthening memories but it is also reorganising them, picking out the emotional details and helping us produce new insights and creative ideas⁰².

Sleep affects our ability to use language, sustain attention, understand what we are reading, and summarise what we are hearing⁰³. If we compromise on our sleep, we compromise on our performance, our mood, and our interpersonal relationships. Sleep has also been shown to protect the immune system⁰⁴.

Animals have evolved to sleep in many different ways. Dolphins can sleep using only one half of their brain at a time. Even hibernating animals have been shown to temporarily cease hibernation, go to sleep (a different, active process), then return to hibernation⁰⁵. Sleep is an inconvenient, time consuming process, but it is so essential that we have simply evolved to fit it into our lives.

How Much Sleep?

We all need different amounts of sleep. Different species of animals require vastly different amounts, as shown in the estimated average sleep times of several species⁰⁶:

Table 1
The sleep needs of various species

Species	Average total sleep time per day (hours)
Python	18
Tiger	15.8
Cat	12.1
Chimpanzee	9.7
Sheep	3.8
African elephant	3.3
Giraffe	1.9

In humans, the amount of sleep a person needs depends upon their age. New born babies tend to sleep for an average of 16–18 hours per day, which decreases to about 13–14 hours after one year. Adolescents tend to require more sleep than adults, possibly due to the physiological changes that are happening in the body during this period.

As the person reaches adulthood they tend to sleep 7–8 hours per day. Older adults tend to sleep roughly 6–7 hours per day⁰⁷, but take more frequent naps throughout the day. The amount of time an average adult needs to sleep varies from person to person, and can range between 5 and 11 hours.

Still, it is important for us to gauge the amount of sleep that we need and to ensure that we get the right amount. There is no set amount of sleep that is appropriate for everyone. For example, although Margaret Thatcher once said that she only needed five hours sleep a night when she was Prime Minister, this would have been unremarkable for her if she was naturally a short sleeper. Just as people may need different size shoes they may need different amounts of sleep. It is vitally important to find out how much sleep we as individuals actually need, and to then recognise that it may be different from the amount of sleep that others need.

Sleeping less than we need as individuals has negative consequences. Whilst awake, we build up a sleep debt which can only be repaid through sleeping. This is regulated by a mechanism in the body called the sleep homeostat, which controls our drive to sleep. If we have a greater sleep debt, then the sleep homeostat indicates to us that we need more sleep.

In a healthy situation this debt is paid off night by night. However, the debt can also build up and be repaid gradually over a period of weeks or even months, for example, if we under-sleep for several nights in a row then we will need to repay the sleep debt in the near future. Interestingly, for people with bipolar disorder, the state of mania is associated with decreased perceived need for sleep⁰⁸. However, despite this perception, the person is still building up a sleep debt which needs to be repaid.

Sleep Patterns

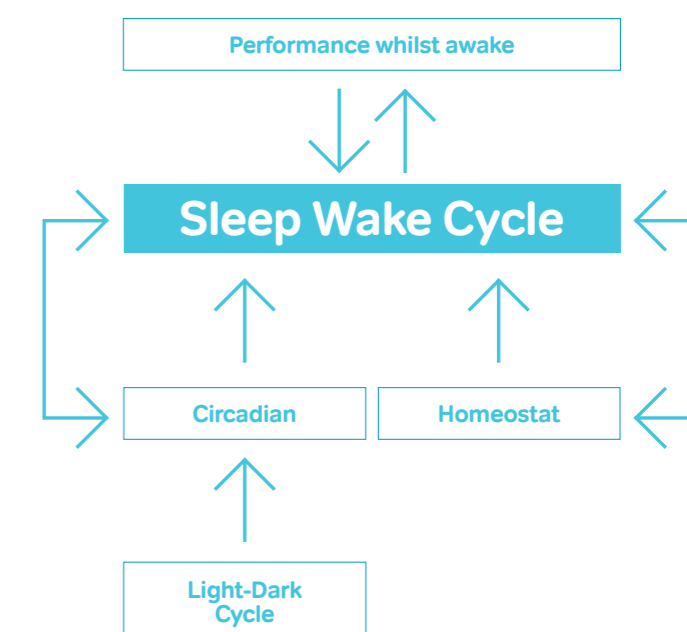
Equally important as the total amount of sleep is the pattern of sleep. Babies and small children tend to sleep multiple times across each 24 hour period, but as we mature into school years and into adulthood we tend to sleep in one long phase; daytime sleeping decreases and the person instead tends to sleep throughout the night.

A mechanism called the circadian timer regulates the pattern of our sleep and waking, and interacts with the sleep homeostat. Most living things have internal circadian rhythms, meaning they are adapted to live in a cycle of day and night.

The French geophysicist Jean-Jacques d’Ortous de Mairan was the first to discover circadian rhythms in an experiment with plants in 1729. Two centuries later, Dr. Nathaniel Kleitman studied the effect of circadian rhythms on human sleep cycles⁰⁹. These rhythms respond primarily to light and darkness. The cycle is actually slightly longer than 24 hours^{10 11}.

It is possible to think of a “master clock” which regulates our circadian rhythms. This clock is made up of a group of nerve cells in our brain called the suprachiasmatic nucleus (SCN). The SCN controls the production of melatonin, which is a hormone that makes us feel sleepy. During sleep, melatonin levels rise sharply. The SCN is located just above our optic nerves, which send signals from the eyes to the brain. Therefore, the SCN receives information about the amount of light in the environment through our eyes. When there is less light, such as during night-time, it tells the brain to create more melatonin (see Figure 1).

Figure 1
Diagram of sleep homeostat and circadian timer (adapted model from Professor Derk-Jan Dijk, Surrey Sleep Research Centre)



Serotonin is another chemical that affects sleep; produced by the brain, insufficient levels of serotonin are also related to mental health problems such as depression and anxiety. Levels of serotonin are highest in the brain when we are awake and active, and the brain produces more serotonin when it is lighter outside. This is why most people feel tired at night-time, and why it is a good idea to turn off the lights when we are trying to sleep. The immune system also influences serotonin, and therefore influences sleep patterns¹², which may explain why we need to sleep more if we are feeling ill.

As humans are mainly daytime animals, the period we choose to sleep is determined naturally by the level of light in the environment; principally due to the setting and rising of the sun. But we can now manipulate light levels through the use of artificial lights, which means that we can continue activities long into the evenings. People who work nightshifts may wish to reduce the level of light they are exposed to during the daytime in order to sleep, and can do this through the use of blackout curtains.

The story of the Copiapó mining accident in Chile in 2010 shows the importance of light for circadian rhythms. Miners' sleep-wake cycles were completely disrupted in the absence of sunlight. The National Aeronautics and Space Administration (NASA) consultants advised the miners to segregate their space into working, sleeping, and recreation areas.

They used the lights on their helmets and the headlights on the mining trucks to create a communal 'light' area. The sleeping area was kept dark, meaning that the miners could regulate the daylight cycle artificially and maintain a regular pattern of sleep. This is an extreme example, but in fact, even moderate changes in lighting can affect our internal circadian timers¹³.

Sleep patterns vary greatly, some animals are diurnal and tend to sleep during the night time, and others are nocturnal and sleep mostly during the daytime. Within humans, each person's circadian timer is set slightly differently; some people function best in the mornings (larks), others best in the evenings (owls), many of us are somewhere in between.

Some people suffer from what is known as circadian rhythm sleep disorder, which is an extreme end of this spectrum, but is often associated with mental health problems. An extreme 'owl' may have delayed sleep phase syndrome, tending to fall asleep and wake up very late. An extreme 'lark' may have advanced sleep phase syndrome, rising very early in the morning but plagued with sleepiness in the evening. These irregularities can become problems, depending upon what we are trying to do in life, although for some they can prove to be an asset.

Similar effects are commonly seen in people whose sleep pattern is disrupted due to external factors, such as working regular night shifts (particularly after working regular day shifts in the weeks beforehand). Another example is jetlag which is caused by travel between different time zones. Both shift work disorders and jetlag are very common expressions of circadian rhythm disorders. Humans are not designed to be awake during the night and asleep during the day. People who regularly work night shifts are thought to be at a greater risk of cancer¹⁴ and heart disease¹⁵. International flight crews are also at elevated risk of cancer, possibly due to repeated disruption of circadian rhythms.

Disruption of sleep and circadian rhythms are also documented in people who suffer from bipolar disorder, although it is unclear whether the circadian timer or sleep homeostat is responsible for the underlying sleep disturbances¹⁶. It has been suggested that changes in a person's circadian rhythms can act as a trigger for bipolar disorder¹⁷, particularly mania¹⁸.

Humans are not designed to be awake during the night. People who regularly work night shifts are thought to be at a greater risk of cancer and heart disease.

**‘The machinery
is always going.
Even when you sleep.’**

Andy Warhol

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Sleep

The stages of sleep

In humans, sleep can be broadly divided into non-rapid eye movement (non-REM) sleep and rapid eye movement (REM) sleep.

We typically pass through four stages of non-REM sleep before beginning REM sleep. In total, non-REM sleep accounts for about 75–80% of total sleep in an average adult.

This process is cyclical and during a single night we may experience four or five recurring cycles of non-REM and REM sleep each lasting between 90–110 minutes. Only recently have scientists begun to understand the process, especially since sleep research has been aided by three measurements:

- 01 Brain wave activity using an electroencephalogram (EEG), which measures electrical activity in the brain.
- 02 Muscle tone through an electromyogram (EMG).
- 03 Movement of the eye via an electro-oculogram (EOG).

Of these three, the EEG is the most important in helping to differentiate between the different sleep stages. While awake, our brains display a pattern of brainwaves known as beta waves. Beta waves are high in frequency, meaning they occur in quick succession, but they are low in amplitude, meaning they are quite small.

Whilst we are awake these waves do not follow a consistent pattern. This makes sense because when we are awake, our brains are often doing a number of different tasks, stimulating the brain in a variety of different ways. When we rest with our eyes closed, our brain wave activity slows down and becomes more synchronised, these brain waves are known as alpha waves.

Non-REM stage one

The first of the five sleep stages is a form of light sleep, or non-REM stage one sleep. This stage is essentially the bridge between being awake and sleep.

Sleepers drift in and out of light sleep and can be awakened easily. During this stage, the person may begin to breathe more slowly and evenly, the brain produces theta waves, which are smaller and lower in frequency than alpha waves. Muscle activity, measured by the EMG, shows a slowing down of movement and the sleeper may begin to twitch.

These twitches are called hypnic jerks and sometimes wake the sleeper, particularly if the jerk is accompanied by the sensation of falling, which many people experience from time to time. Since individuals may have some knowledge of the world around them, it is in this stage of sleep that some people report out-of-body experiences.

Non-REM stage two

Within a few minutes, the sleeper may pass into another form of light sleep known as stage two of non-REM sleep. The sleeper's breathing pattern and heart rate slow down and they become less aware of the outside world. Eye movement stops and sleepers' theta waves become even slower with the occasional bursts of brain activity every minute or so; these bursts of activity are sometimes known as sleep spindles.

Stage two non-REM sleep is also characterized by a type of brain wave activity known as a K-complex. A K-complex is a high voltage of EEG activity with a sharp downward spike followed by a slower upward component; it sometimes resembles a mountain. This stage accounts for the largest part of human sleep (45–50% of sleep in adults¹⁹) and is sometimes referred to as true sleep. Like stage one sleep, stage two is also considered relatively 'light' sleep and if sleepers were to be woken up during either of these stages they may deny that they had been asleep at all.

The first of the five sleep stages is a form of light sleep, or non-REM stage one sleep. This stage is essentially the bridge between being awake and sleep.

Non-REM stages three and four
Stages three and four are typically grouped together as the last stages of non-REM sleep, also referred to as synchronised sleep.

For these stages, sleepers pass from the theta waves of stages one and two to delta waves, the largest and slowest brain waves. There is no real distinction between stage three and four except typically during stage three, sleep is comprised of less than 50% delta waves, and in stage four more than 50% of the waves are delta waves. Thus these stages are often referred to as slow wave sleep or deep sleep. Sleepers' breathing and heart rate are at their lowest levels, they breathe rhythmically and their muscle activity decreases.

Deep sleep is a very refreshing type of sleep, and it is particularly important in helping the brain consolidate what it has learnt during the day²⁰. If awakened during these stages, sleepers report feeling groggy and disoriented for several minutes. Illustration of the sleep stages is shown in Figure 2.

Eventually, the sleeper will pass into REM sleep. This takes its name from the rapid eye movements that the sleeper displays, usually with their eyes closed, as discovered in 1953 by Nathaniel Kleitman and Eugene Aserinsky. The frequency of one's rapid eye movements is known as their REM density.

During this stage, the brainwaves are similar to when we are resting, although our breathing rate and blood pressure rise, all our voluntary muscles also become paralyzed and our muscle tone becomes relaxed so that we cannot move our limbs. This is a relatively shallow stage of sleep; the average person will have around three to five episodes of REM sleep per night, and the first period is likely to begin about 70–90 minutes after falling asleep. It is during this stage of sleep that we experience dreams.

The amount of time spent in the different sleep stages appears to relate to people's mental health. Those who suffer from depression have been shown to have more REM sleep, enter this stage earlier, and have increased REM density²¹. For people with schizophrenia, there can be a delay in reaching deep sleep and REM sleep²². Similarly, people who suffer from anxiety may spend less time in deep sleep²³. However, this is an area to be explored in future research to provide more precise information.

Dreaming

Dreams have been a subject of awe and inspiration for thousands of years, appearing in the oldest works of literature, such as Epic of Gilgamesh (c.2200 B.C.), as well as in recent Hollywood blockbusters such as Inception and Shutter Island (2010). Some people are better at remembering dreams than others, but most would agree that their dreams are meaningful to them. Many people believe that dreams are a gateway for understanding our feelings, thoughts, behaviours, motives and values.

The theoretical link between dreaming and eye movements during sleep was made as far back as in 1868²⁴, and the explicit connection between REM sleep and dreaming was made almost a century later²⁵. It is possible that our eyes move because we are following the images of the dream in our sleep. Since we all experience REM sleep, we all have the potential to experience dreams. Still, the purpose and function of dreams remains unclear.

There are many theories on the meaning of dreams. Some scientists believe they serve no real purpose, while others believe they are integral to our mental, emotional, and physical wellbeing. The most well-known theory comes from the Austrian neurologist Sigmund Freud who founded the school of psychoanalytic thought. According to Freud, dreams are subconscious wishes²⁶. He believed that the images, thoughts and emotions experienced in a dream were attempts by our unconscious to resolve a conflict in waking life, and that the process of dreaming allowed for an interaction between the unconscious and the conscious.

The part of the brain involved in emotions, sensations and memories becomes more active during REM sleep. So the brain may attempt to make sense of this internal activity and the result is a dream²⁷. Dreams may therefore be the result of signals generated within our brains.

Another theory²⁸ suggests that dreams may help humans to maintain sleep, by keeping the mind occupied so that we don't wake up.

It suggests that dreams may entertain the brain so that other areas can rest and recover, and without this kind of diversion, the brain would keep telling us to wake up. However, these are merely theories, and the exact reasons why we dream are still uncertain.

What we do know is that dreams are associated with an abundance of a chemical called dopamine in the brain. Dopamine is a neurotransmitter (a chemical that transmits signals within the brain) that helps to direct our attention to important things in our environment. Both dreams and hallucinations involve deregulation of dopamine production. It is thought that dreaming may be similar to some of the symptoms of schizophrenia, since they appear to have similar neurochemical backgrounds²⁹.

Dreaming and REM sleep are also strongly related to major depression, and people who suffer from this illness often display more frequent rapid eye movements than normal - literally, people with depression dream more¹⁵. It actually appears as though getting too much REM sleep can increase our vulnerability to depression. Interestingly, many antidepressants aim to limit REM sleep³⁰.

One night of sleep deprivation, particularly the deprivation of REM sleep, may relieve depressive symptoms in the short term. However, this cannot be recommended as a treatment for depression since individuals become susceptible to symptoms again once they have repaid their sleep debt^{31,32}. More importantly, the negative consequences of sleep deprivation can be far more damaging.

Figure 2
Brain waves during the stages of sleep

Awake – eyes open/Alpha Waves



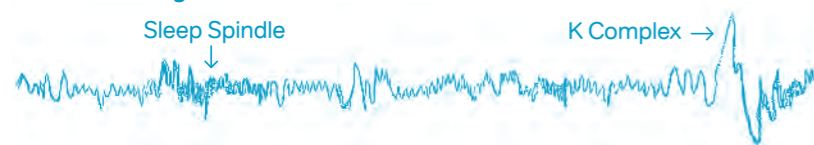
Awake – eyes closed



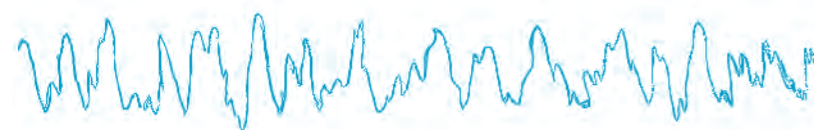
Non-REM – Stage 1/Theta Waves



Non-REM – Stage 2



Non-REM – Stage 3 & 4/Slow Waves and Delta Waves



REM



**‘Sleeplessness
is a desert
without vegetation
or inhabitants.’**

Jessamyn West

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Part 02

Poor Sleep

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Poor sleep relates not only to the total amount of sleep, but also to the quality of sleep and the amount of time spent awake. Good quality sleep includes all of the aforementioned sleep stages, with a significant amount of time spent in deep sleep.

Insomnia

Most of us have experienced a sleepless night, which although upsetting, is nothing to worry about since the sleep debt can be repaid over the course of the next few nights. The inability to fall or remain asleep over a period of several nights is known as insomnia.

People with insomnia have poor quality sleep, may be unable to get enough sleep, and may wake up for long periods during the night, resulting in fatigue during the daytime. Insomnia is a psychophysiological disorder, which means that it is a combination of our thoughts, behaviour, emotions and physiology. Insomnia can be acute (lasting less than a month), or it may develop into a chronic, long-term condition.

Essentially, insomnia is associated with arousal of our mind and body. Typically people complain of a racing mind and get into a vicious cycle of poor sleep, concerns about poor sleep, and patterns of thoughts and behaviour that are unhelpful. This means that the normal operation of the sleep debt and circadian mechanisms do not work properly. The result of a series of sleepless nights can be serious.

Insomnia is by far the most common sleep complaint in the general population. It is a massive public health problem, and the most commonly reported mental health complaint in the UK³³.

Sleep quality is of paramount importance to our health. People who have slept poorly are likely to suffer from fatigue, sleepiness during daytime, poor concentration, irritability, memory loss, depression, frustration, and a weakened immune system. Fatigue – feeling weary and lacking in energy whilst awake – is the most common problem associated with poor sleep.

This is different to sleepiness because it doesn't necessarily increase the likelihood of falling asleep. Signs of sleepiness include yawning, muscle ache, and drifting off to sleep. Furthermore, poor sleep can make us less receptive to positive emotions³⁴ which in turn can make us feel miserable during the day, and may increase the likelihood of us developing depression³⁵.

Evidence from experiments involving rats suggests that in extreme cases, sleep deprivation may even be fatal³⁶. Indeed, there is an extremely rare genetic disorder called fatal familial insomnia, affecting around 100 people worldwide. This usually begins between the ages of 35 and 60, and leads to death several months later. Poor sleep can also affect the circadian timing mechanism. Keeping an irregular sleep pattern can make insomnia worse. People who suffer from insomnia are likely to feel the effects of sleep deprivation throughout the daytime.

It may be tempting to catch up on sleep by 'grazing' at opportune moments across the day, but even though this temporarily recoups a small amount of sleep debt, unfortunately it also disrupts the sleep pattern.

A person with insomnia may get into a habit of sleeping in short shifts throughout the day, which then may make it difficult for them to sleep at bedtime. The problem with napping like this is that the person only sleeps for short periods of time. This means that they are likely to get lots of light sleep without ever passing through all the sleep stages. In particular, they fail to achieve the essential deep sleep necessary for restoration of mind and body, and fail to recover their sleep debt.

Sometimes insomnia can be related to physical health problems. Most of us will have experienced an illness which has made it harder to sleep due to physical discomfort or irritation, such as a blocked nose or sore throat. Some chronic conditions, such as osteoporosis or diabetes, can drastically affect sleep in the long term. Addressing physical health problems could improve sleep quality. It may be possible also to address the sleep problem alongside the health problem rather than just treating it as a symptom.

Our mental state is perhaps even more important in allowing or preventing insomnia from developing from an acute into a chronic problem. This refers particularly to our thoughts and attitudes about sleeping. For example, some of us, after suffering several consecutive sleepless nights, may become anxious that we have not had enough sleep. This type of thought process is likely to lead to thinking about the problems associated with not sleeping.

This can lead to anxious thoughts, which can then lead a person to see themselves as failing to sleep well. These thoughts perpetuate a negative cycle, making it even more difficult for the person to sleep. Many of us may recognise this behaviour if we have watched the clock during the night. This is a very common activity for people who suffer from insomnia, where the clock starts to be used as a gauge to monitor sleep performance. This pressure to perform in turn makes it more difficult to sleep.

Sleeping poorly increases the risk to poor mental health, which is often neglected when aiming to improve health and wellbeing. Insomnia is inextricably related to mental health. Many of us will have experienced a sleepless night due to worrying about an upcoming event, such as an exam or a job interview.

A prolonged period of stress or worry can also seriously affect our ability to sleep. In a sample of roughly 20,000 young adults, lack of sufficient sleep was linked to psychological distress³⁷, and a history of insomnia has been shown to increase the risk of developing depression^{38,39}. Unsurprisingly, anxiety and depression are also common causes of chronic insomnia⁴⁰. People who suffer from depression may experience sleep disturbances which disrupt the process of falling and staying asleep. The sleeper may wake intermittently throughout the night, or wake early in the morning and be unable to sleep again⁴¹.

Furthermore, insomnia is a common complaint in people who suffer from schizophrenia⁴², and some schizophrenia medications can profoundly affect a person's ability to maintain constant sleep⁴³. People visiting sleep disorder clinics with the complaint of insomnia often have another underlying mental health problem⁴⁴. This type of insomnia is more difficult to treat since it involves treating the underlying problem as well as the insomnia.

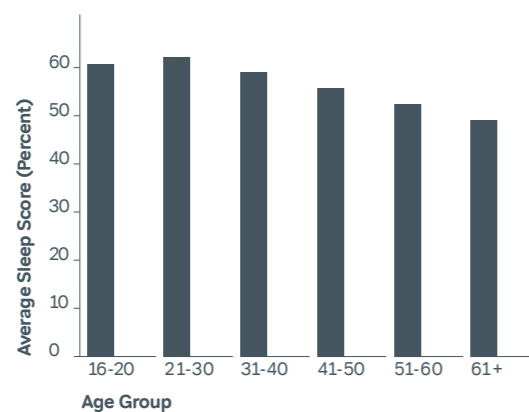
The Great British Sleep Survey: new data on the impact of poor sleep

The Great British Sleep Survey was launched by Sleepio to measure the sleep quality of the UK population. By December 2010 there were 1870 responses from men and 4838 from women (total = 6708).

The average age of respondents was 40 years for men and 37 for women. Average sleep scores were calculated for each person based upon the answers that people gave to the survey, with a higher score representing better sleep quality (0% = very poor, 100% = excellent).

The results showed that men had better sleep quality than women; the average sleep score was 61% for men and 57% for women. Unsurprisingly, sleep was related to health; people who rated their physical health as 'poor' had an average sleep score of 47%, significantly worse sleep than people who rated their health as 'good' (63%). The average sleep score tended to decrease with age, though there was some inconsistency in the relationship between age and sleep (see Figure 3).

Figure 3
Chart of average sleep score by age (N=6708)



Some caution should be used when discussing the results of this survey, since those who responded were more likely to have taken an interest in their own sleep, possibly because they had a problem with sleeping. The sample therefore cannot be truly representative of the UK population.

Only 38% of survey respondents (2522 people) were classified as 'good sleepers', whilst 36% were classified as possibly having chronic insomnia (2414 people). Insomnia was slightly more common in women (37%) than in men (32%), and 79% of those who had insomnia reported having it for at least two years. Other estimates of insomnia have put the total figure at around 30% of adults, although rates depend upon the criteria used to define it⁴⁵. Of the people reporting insomnia in the survey, over 30% have had insomnia for 2-5 years, and over 25% for over 11 years (Figure 4)

Figure 4
Duration of insomnia (N=6708)

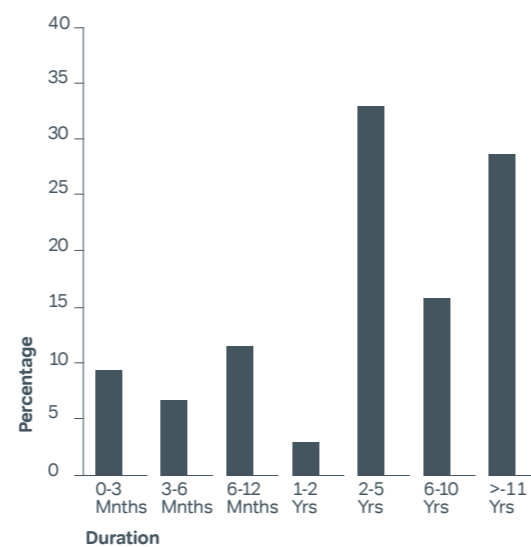
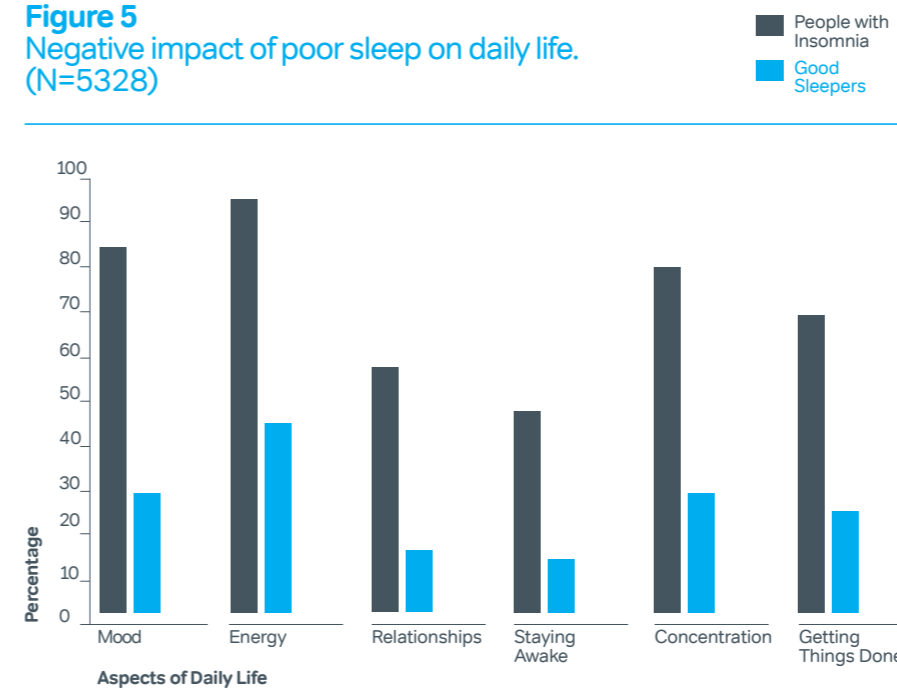


Figure 5
Negative impact of poor sleep on daily life. (N=5328)



Other data from the survey showed that insomnia had a negative effect on people's mood, energy, concentration, personal relationships, ability to stay awake during the day, and ability to carry out daily tasks (Figure 5).

In comparison to good sleepers, over four times as many respondents with insomnia reported relationship difficulties. The ability to maintain good relationships with friends, family and partners is naturally important to an individual's personal happiness, affecting their mood and, in the longer term, their susceptibility to depression. More than 80% of respondents with insomnia said they regularly experienced low mood. This is more than three times the figure for good sleepers. Sustained low mood can lead to depression.

Over 45% of respondents with insomnia had difficulty staying awake during daylight hours, compared to just over 10% of good sleepers. Although sleepiness is to be expected in people with insomnia, it may encourage the person to keep an irregular sleep pattern. This in turn upsets the circadian rhythm and can make the insomnia worse.

Nearly 95% of respondents with insomnia reported low energy levels in their daily lives, considerably more than twice the percentage for good sleepers (just over 40%). This has a range of mental and physical health implications, particularly with regard to an individual's ability to take regular exercise, which in itself is an effective way of reducing stress, anxiety and depression.

The impact of insomnia on energy levels indicated by the survey therefore has the potential to create a vicious cycle of deteriorating health: insomnia decreases an individual's capacity for exercise, negatively affecting their mental wellbeing, in turn worsening their insomnia.

The survey data indicated that over 75% of people with insomnia experienced poor concentration, and nearly 70% reported difficulties in 'getting things done'. In both instances, this is approximately three times more than the percentage for good sleepers. This inability to concentrate and carry out tasks shows how the implications of poor sleep can affect wider society, for instance, in terms of impairing productivity in the workplace.

Overall, the data from the survey has demonstrated the extent to which sleep influences people's everyday lives, both in terms of physical and mental health. Factors adversely affected by insomnia, such as exercise, can create vicious cycles where the impact of insomnia worsens an individual's capacity to tackle the problem. As such, the data illustrate the complexity of tackling sleep problems. Effective methods of breaking this cycle are detailed in Part III of this report.

Hypersomnia and narcolepsy could be misconstrued as insomnia due to the extreme tiredness, but they are very different and should be treated as such.

Oversleeping

Although it is nowhere near as commonly reported as insomnia, sleeping too much may also cause problems.

Oversleeping has been linked to physical health problems such as diabetes⁴⁶ and cardiovascular disease⁴⁷. Oversleeping can occur in some people who suffer from depression, roughly 15–40% of whom oversleep⁴⁸.

Hypersomnia and narcolepsy

There are also some conditions such as hypersomnia and narcolepsy in which a person suffers from extreme sleepiness during the day. Sufferers of hypersomnia may complain that they do not feel fully awake until several hours after getting up. People who suffer from narcolepsy may suffer from extreme sleepiness, often at inappropriate times in the form of sudden sleep attacks.

Cataplexy is also common in people with narcolepsy. This is defined by a sudden loss of muscle tone, which can often leave the sufferer paralysed for a short term.

Both hypersomnia and narcolepsy are rare (estimated at 0.3% of the general population for hypersomnia and 0.045% for narcolepsy⁴⁹); however, they can have severe consequences for a person's daily life. They could be misconstrued as insomnia due to the extreme tiredness, but they are very different and should be treated as such.

**‘All men, whilst they
are awake, are in
one common world:
but each of them,
when he is asleep,
is in a world of his own.’**

Plutarch

sleep

sleep

Problems that happen whilst asleep

As detailed earlier, sleeping is a complex process which involves the body going through a number of different stages. During the sleep cycle we can react in several different ways, and a number of problems can occur. These problems can impact on our sleep quality.

Some are very common, such as snoring. Others are much rarer but can cause great problems for the sleeper. Abnormal movements or behaviour that occur during sleep are sometimes called parasomnias. Well-known parasomnias include nightmares, teeth grinding, night terrors and sleepwalking. Often these problems can be related to the mental and physical health of the individual that suffers from them.

Snoring

Of all sleep problems, snoring may seem one of the more innocuous. However, it can cause problems for the partners of snorers whose own sleep quality may be affected. Strictly speaking, snoring is a respiratory problem heightened when a person is sleeping, not a sleep problem in itself.

Snoring is very common, approximately 37% of UK adults snore⁵⁰. It is twice as common in males as females, although post-menopausal women are more likely to snore than pre-menopausal women. Partners may find their own sleep disturbed and may need to sleep in separate rooms. There is a suggestion that after undergoing surgery to stop snoring, sleep quality of partners improves⁵¹.

The snoring sound is produced through a partial obstruction in the airway, within which the organs that help us breathe vibrate. The muscles relax at the base of the tongue and the uvula (the small fleshy piece which hangs at the back of the throat).

The relaxation of muscle tone can cause the airway (composed of nose, throat, mouth and windpipe) to become partially or completely obstructed. Other possible causes that can restrict airflow can be jaw problems or nasal congestion.

A person's size and body shape can also have an impact on whether they are likely to snore. For instance, people with shorter, wider necks are more inclined to snore because the muscles around their windpipe cannot support the tissue that surrounds it when they sleep. Alcohol also increases snoring, since it relaxes the tissue at the back of the throat causing it to collapse into the airway and vibrate more easily.

There are a number of treatments for snoring, most of which rely on unblocking the breathing passage, such as nasal strips and sprays. Still, if snoring becomes a problem, then it is better to seek professional medical advice first.

Sleep Apnoea

Snoring during REM sleep is often a sign of obstructive sleep apnoea, a potentially serious respiratory problem. While sleeping, an individual will experience pauses in breathing or shallow breath.

Sufferers may stop breathing for up to minutes at a time, potentially starving the brain of oxygen. Normal breathing usually resumes, with the individual often making a loud snort or choking sound causing the airway to unblock, waking the individual up and disrupting their sleep. Obstructive sleep apnoea occurs in approximately 3–7% of adult men and 2–5% of adult women. It is more common in older people and in those who are overweight⁵². Both smoking and alcohol also increase the risk of developing it.

Sufferers may find themselves waking up sweaty, with a dry mouth and a headache. The frequent waking throughout the night can lead to insomnia, excessive fatigue and sleepiness during the daytime. Undiagnosed obstructive sleep apnoea is associated with increased likelihood of hypertension, cardiovascular disease, stroke, sleepiness during the daytime, and motor vehicle accidents⁵³. The most widely used treatment for obstructive sleep apnoea is positive airway pressure. The sleeper wears a special mask over the nose or mouth during sleep, whilst a breathing machine pumps a stream of air in the nose or mouth through the mask.

Case Study

K* is a 36 year old female from Bedfordshire, whose sleep cycle is out of synch. She goes through periods of not sleeping very much, merely a couple of hours per night, to sleeping all the time, sometimes up to 19 hours a day. During this period of oversleeping, she has a strong desire to sleep during the day and stay up all night. In spite of such long periods of sleep, she doesn't wake up feeling refreshed.

She first remembers her sleep problems starting around the age of 13. She would wake up from a frightening experience feeling anxious but ultimately unable to recall what it was she was experiencing. Sometimes she would wake up and find she was unable to move her body or to scream out. As a result of the frequency of these experiences, she began to feel afraid to go to sleep and eventually she got out of the habit of sleeping properly.

She now knows that these episodes are known as night terrors and still continues to have them today in adulthood, though they come and go in phases.

Nightmares

Many of us will have experienced a nightmare from time to time. This is defined as an intense, frightening dream that wakes the sleeper in the throes of panic. Usually nightmares occur in the early morning and often they are influenced by frightening experiences that have occurred during the day.

Recurrent nightmares are said to typically occur due to anxiety. People who suffer from post-traumatic stress disorder (PTSD) can experience distressing dreams or nightmares as a consequence of past traumas, and may experience significant interruptions during REM sleep⁵⁶.

Occasionally, we may experience an episode of sleep paralysis; this happens after waking suddenly from REM sleep, which often happens following a nightmare. Our muscles are paralysed during REM sleep, but during an episode of sleep paralysis they remain paralysed for a short period of time after waking. In old English folklore, sleep paralysis was said to be due to supernatural forces sitting or pressing down upon the sleeper's chest (Figure 6).

Figure 6
The Nightmare, Henry Fuseli (1781)



Night Terrors

Night terrors are perhaps the most disturbing type of parasomnia. Like sleepwalking and sleep talking, they occur during deep sleep. They can be intense, frightening, and severely disabling experiences. A night terror is different to a nightmare since the latter occurs during REM sleep and can be recalled on waking.

Most often night terrors begin and end in childhood. It has been estimated that 18% of children experience them⁵⁹, but only 2.2% of the adult population⁵⁵. Like sleep walking, night terrors are more likely to occur under sleep-deprivation, after drinking alcohol, or during a period of stress.

Upon experiencing a night terror, the sleeper will feel a deep sense of fear and panic, their heart rate will rise, and they may begin sweating and screaming. There will often be very little, if any, recall of the details of the event the following morning.

Little is known about how to treat people who experience persistent night terrors. However, more severe cases could be related to traumatic experiences, particularly in childhood. If this is true, then evidence-based treatments for trauma may help.

Sleepwalking and sleep talking

Sleepwalking (somnambulism) and sleep talking (somniloquy) are commonly reported parasomnias. Both activities occur during deep sleep (stages 3 and 4), and are unrelated to dreaming, with people rarely recalling them upon waking.

Sleepwalking most commonly occurs in children between the ages of five and twelve years; 15% of children in this age group are said to walk in their sleep at least once⁵⁷. It is much less common in adults, occurring in about 2–5% of the adult population⁵⁸, the majority of whom began sleepwalking when they were children. Sleep walking is more likely to occur when people have been sleep-deprived, drinking alcohol, or under stress.

Sleep talking occurs in about 4% of adults, though again more frequently in children. This can range from non-verbal utterances to eloquent speeches, which occur several times during a night's sleep. The speech may or may not be comprehensible to listeners. Sleep talking rarely presents a serious problem. In fact, it is much more likely to be problematic for the partner if they are disturbed during the night on a regular basis.

Sleepwalking can become a problem when people run the risk of injury, either within the house or if they go outdoors. Some sleepwalkers conduct activities during their sleep, such as cleaning. It can also be associated with bedwetting; it is not uncommon for people to urinate in closets and cupboards during a sleepwalking episode.

In extremely rare cases people conduct violent activities. In the UK, a man unknowingly strangled his wife while on a caravan holiday. He thought he was fighting off some assailants who he believed had broken into their caravan. He was acquitted on all charges on the grounds that he was not conscious and not in control of his actions.

Teeth Grinding

Also known as bruxism, this is characterised by grinding one's teeth, and is sometimes accompanied by clenching of the jaw. It can occur during day or night. During the day, it is often in reaction to certain feelings or events that may occur. During sleep, however, bruxism is characterised by automatic teeth grinding and rhythmic jaw muscle contractions.

In one study, 8.2% of the general population were estimated to grind their teeth at least twice a week during sleep, and 4.4% were reported to fulfil the criteria for a full diagnosis of bruxism. It was also found to be more common in those who regularly consume large amounts of caffeine, alcohol and nicotine⁵⁴. Importantly, bruxism can be symptomatic of underlying stress and anxiety; one study found that roughly 70% of sufferers attributed their teeth grinding to these causes⁵⁵.

Case Study

G*, 46, from Liverpool has had problems with her sleep for the past 15 years. Initially they began with trying to stay asleep. She'd wake up frequently throughout the night after sleeping for 1 ½-2 hours, and on average she would sleep a total of 3-3 ½ hours a night. There was a time when G* was a good sleeper. Sleep problems however, developed after back surgery following a 12 year stretch of shift work. The pain associated from the surgery kept her awake at night and since then she has had trouble maintaining a constant night of sleep.

She has tried keeping good sleeping habits on recommendation from her doctor: she doesn't keep a TV in the room, abstains from caffeine and alcohol and adheres to a strict routine by going to bed at 11pm and getting up at 4am. No matter what she's tried though it doesn't seem to make any difference.

In the last 5 years, G* discovered she was sleepwalking. She'd find objects in strange places, such as the remote control in the bin, as well as odd cooking experiments left out on the hob, such as cereal covered in washing up liquid. After finding herself outside her building, she went to see a sleep specialist fearful she might end up doing more serious harmful behaviour. Unfortunately she was told there was little they could do to help her, as they told her the sleepwalking problem was a symptom of her poor sleep pattern.

There is some evidence that both periodic limb movement disorder and restless leg syndrome can be side effects of antidepressants.

REM Behaviour Disorder

This is a rare condition in which people can be seen to ‘act out their dreams’. This parasomnia tends to begin later in life and is more common in adults over the age of 50, particularly in men.

Most people are unable to move during REM sleep because their muscles are paralysed. However, people with REM behaviour disorder maintain some degree of muscle tone during REM sleep. Therefore, the sleeper is not paralysed and the muscles stay partially active, sometimes with violent results. People acting out their dreams during REM behaviour disorder can injure their partners, and it is not uncommon for couples to get into the habit of sleeping apart for this reason. Interestingly enough, this has also been noticed in other species, such as dogs.⁶⁵

Sleep Related Motor Disorders

People with periodic limb movement disorder may experience an intense or prolonged set of hypnic jerks (involuntary twitches that occur between wakefulness and sleep), and may involuntarily twitch muscles, particularly the legs, whilst sleeping. It occurs in approximately 3.9% of the general population and is slightly more common in women than men⁶⁰. This becomes a problem when it disrupts the sleep of the sufferer or partner.

The reasons for periodic limb movement disorder are unclear, but it may be related to a disturbance in circadian rhythms. Medication can help, particularly those that reduce muscle function during sleep. A similar disorder is restless legs syndrome. Figures from the US estimate that it affects around 7% of the population⁶¹, increasing with age and being more common in women⁶². Sufferers experience unpleasant sensations in their legs, and thus feel irresistible urges to move them; they may only gain relief by walking or moving. Symptoms are said to occur typically in the evenings potentially leading to difficulties in falling asleep.

There is some evidence that both periodic limb movement disorder and restless legs syndrome can be side effects of antidepressants⁶³. The large majority of sufferers of restless legs syndrome do respond to treatment. Mild cases may be treated by abstaining from caffeine and alcohol. There is also some evidence that regular exercise during the day may reduce symptoms, though further research is needed to confirm this⁶⁴. Those who are more severely distressed by restless legs syndrome may experience relief with drugs that mimic the neurotransmitter dopamine in the brain.

sleep

**‘A sleepless night
is as long as a year.’**

Chinese Proverb

sleep

sleep

Part 03

Sleeping Well

sleep

sleep

sleep

This section of the report describes ways in which we can all improve the quality of our sleep.

As highlighted in Part II, sleep is crucial to the health of all individuals. It is important to remember that poor sleep has massive implications for our health; it is in all of our interests to ensure that we sleep better.

Sleep hygiene

Many people can benefit from improving the quality of their sleep. The phrase sleep hygiene is often used to describe how lifestyle and environmental factors can affect our sleep. Positive sleep hygiene may help to improve sleep quality, but is not enough to treat chronic insomnia.

Caffeine, alcohol and nicotine are all substances which can impair sleep quality. Caffeine makes it harder to sleep because it stimulates the central nervous system, increasing your heart rate and adrenaline production, and also suppressing melatonin production. It takes a long time for the body to break down caffeine, so drinking coffee during the day can affect sleep at night.

Alcohol can help people fall asleep, but it also impairs sleep quality during the second half of the night, and it is a diuretic which means that we may need to wake in the night to go to the toilet, disrupting the sleep pattern. However, a rapid reduction in alcohol intake for someone who is a heavy drinker can lead to alcohol withdrawal syndrome, which itself can lead to insomnia. Alcohol can also contribute to depressive mood, which in turn can contribute to insomnia.

Nicotine may impair sleep, smokers take longer to enter sleep and have less total sleep time (approximately 14 minutes less per night) compared to those who have never smoked⁶⁶. Reducing nicotine intake is unlikely to lead to immediate improvements in sleep, but the long term health benefits are likely to have implications for sleep quality.

Eating habits have the potential to affect sleeping. It is important not to go to sleep whilst feeling hungry, so eating a light snack before bedtime may be helpful. However, eating large meals shortly before bedtime should be avoided, because the body will spend time digesting before it can sleep. Some foods may have sleep inducing properties; for example, rice and oats may contain small amounts of melatonin, which increases the desire to sleep. Some foods, such as dairy products, contain the amino acid tryptophan which is useful in manufacturing melatonin.

Other foods, such as those that contain caffeine or large amounts of refined sugar, make sleeping more difficult. A study in the Isle of Wight examining the effects of food additives on health, found that preschool children who received additive-laden drinks were more hyperactive than when they did not have drinks containing colours and preservatives⁶⁷.

Regular exercise may also help us sleep. One study in older adults showed improved sleep quality with regular aerobic exercise⁶⁸, such as jogging or cycling. It may be that physical fitness with increased metabolism is associated with better sleep patterns. Also, exercise can help to improve mood and to reduce anxiety, which can in turn improve sleep in people with chronic insomnia⁶⁹. Exercise can also help to reduce the symptoms of obstructive sleep apnoea⁷⁰.

The timing of physical activity is important. Exercise earlier in the day is better for people who want to improve their chances of sleeping, since in the short term it increases the body's adrenaline production, making it difficult to sleep.

The environment of our bed and bedroom can either help or hinder sleep; much depends on our own preferences. The obvious factors are noise, light, temperature and ventilation. Most of us prefer to sleep in a quiet environment, as anyone who has experienced living next door to noisy neighbours can testify. Earplugs may be useful for blocking out external noise although they do tend to amplify the body's own internal noises which may be distracting.

Too much light can inhibit sleep since it affects melatonin levels; eye masks may be helpful, although they can be uncomfortable for some. Room temperature is important, neither too cold nor too hot, although the ideal room temperature will vary from person to person. Ventilation can be improved by opening the window, although this is likely to alter the temperature and make the room noisier. It is important to feel comfortable in the bedroom environment, including selecting the right mattresses and pillows. People may need to experiment with all these factors until they find the ideal balance.

Sleep hygiene practices, such as those mentioned above, may help people improve their sleep quality, but there is little evidence to suggest that they help people who have chronic insomnia, in which case more specific treatment is needed. It is important to consider whether the insomnia is caused by physical or mental health issues. However, more often than not it will be important to directly address sleep itself, and not simply rely on treating the physical or mental illness.

Sleep medication

The most common and well known treatment for insomnia is sleep-inducing medication, also known as hypnotics.

The most common type of hypnotic are a group of drugs called benzodiazepines, the most well-known of these is diazepam (Valium) which is used to treat anxiety and has been around since the early 1960s. Similar drugs like temazepam can be useful for short term insomnia, but there is little evidence to suggest that they are appropriate for chronic insomnia⁷¹.

Another commonly-used group of drugs developed more recently are the benzodiazepine receptor agonists; sometimes these are called 'Z drugs' since many of their names begin with the letter 'Z' (zopiclone and zolpidem, for example). There are various other groups of drugs that may potentially be prescribed for insomnia; melatonin receptor agonists aim to promote sleep by increasing the amount of melatonin in the body, orexin antagonists aim to limit the hormone orexin which is related to being awake, and some antihistamines and (rarely) opioids can be used as sedatives.

Some antidepressants do have a sedative effect, and research has shown that people who were treated using a combination of sleeping medication and antidepressants showed greater improvements in depressive symptoms than people who used antidepressants only^{72 73}.

However, the British Association for Psychopharmacology advises against using antidepressants in the treatment of insomnia as there is limited evidence indicating their efficacy in this application⁷⁴.

It is difficult to gauge how many prescriptions are written for hypnotics because many of these drugs are prescribed for problems that are not directly sleep-related. Up to 40% of people with insomnia may self-medicate with hypnotics that are available without a prescription, and many people also drink alcohol to aid sleep.

Hypnotics may be effective for short-term acute insomnia, particularly for conditions like jet lag. However, they only act on the biological, neurochemical factors to help us sleep. Many people develop tolerance to hypnotics and become physically or psychologically dependent, or suffer withdrawal symptoms such as anxiety, depression and nausea. Some types of hypnotic, such as benzodiazepines, can cause 'rebound insomnia', which is often worse than the original insomnia symptoms.

Also, hypnotics can have a range of side effects. The National Institute for Health and Clinical Excellence⁷⁵, suggest that hypnotics should only be used after other measures have been tried, and then only for short periods of time, such as 2–4 weeks maximum.

Use of sleep medication dates back thousands of years; Hippocrates noted the sleep-inducing properties of opium in c.400 B.C.

sleep

sleep

sleep

**‘Sleeping is
no mean art:
for its sake one must
stay awake all day.’**

Friedrich Nietzsche

Psychological approaches

These approaches can be effective because they aim to challenge underlying thoughts and feelings about sleep⁷⁶. Cognitive Behavioural Therapy (CBT) is the most effective treatment for chronic insomnia.

It has also been used to treat people with a range of mental health problems such as depression and anxiety, and is part of the Improving Access to Psychological Therapies (IAPT) agenda. It can be used alongside hypnotics or without.

A comprehensive CBT approach for insomnia includes a variety of techniques, such as sleep hygiene regimes (as described previously), relaxation training, readjusting sleep patterns, and altering the thoughts and behaviours that hinder people from sleeping^{77 78}.

The importance of relaxation should not be taken for granted. People with insomnia tend to find it hard to relax naturally before going to bed. Relaxation training involves paying attention to breathing and ensuring that muscles are not tensed up. People who have trouble sleeping should 'wind down' in the hour before going to bed, possibly doing relaxing activities such as listening to music.

The act of relaxation does not always come naturally and may require patience, discipline and practice. Activities that some people consider relaxing may not be appropriate for others. For this reason it may be helpful to have a tailored relaxation programme developed by a CBT practitioner.

Thoughts and feelings about sleep play a large role in perpetuating insomnia⁷⁹. People with chronic insomnia often associate sleep and bedtime with a range of negative thoughts and feelings. CBT aims to question the assumptions behind our thoughts, and to break the links between our thoughts and how we feel about them, i.e., our emotions. An example of how our thoughts can influence our emotions with regard to sleep is as follows:

- 1 Fact**
I'm not feeling very sleepy right now
- 2 Thought**
It's already 1:30 a.m., I'm never going to get to sleep'
- 3 Emotion**
Everybody else is sleeping, I'm no good at sleeping
- 4 Consequence**
Continued lack of sleep

Here the individual has thought about the fact in a particular way, by generalising that they will never get any sleep all night. In fact, even people with insomnia sleep on most nights, but tend to underestimate the amount of sleep they have had upon reflection the next day. Therefore the statement "I'm never going to get to sleep" is likely to be false. The individual places more emphasis on this thought than the fact itself. The subsequent emotional consequence generalises further still from the original fact, and feeds back into a person's thoughts about themselves, negatively affecting their ability to sleep.

An alternative way of approaching this situation, which could be recommended through the use of CBT methods, might be:

- 1 Fact**
I'm not feeling very sleepy right now
- 2 Thought**
I'm not sleepy now; but I usually get some sleep during the night. Maybe I will feel sleepy soon.
- 3 Consequence**
I'm going to get out of bed to go to the toilet and drink some water. I will return to bed in a few minutes when I feel more sleepy

In appraising the situation more accurately and more positively, the individual does not place undue pressure on themselves to get to sleep, and is then more able to take practical steps to help them adjust to the process of going to sleep. If the person does not fall asleep, a positive way of thinking about the situation could be:

- 4 Thought**
It doesn't matter whether or not I fall asleep. I can function well with little sleep. I will relax and not worry about it. I will fall asleep when my body is ready.

The link between our thoughts and the values we place on those thoughts is very important in overcoming insomnia.

Good sleepers treat sleep as an automatic process which happens when they go to bed. In other words, they do not spend time thinking about sleep, or about how they need to get to sleep⁸⁰. In CBT, a technique called paradoxical intention is used. When a person is finding it difficult to fall asleep, they may be advised to remain awake passively and to give up trying to fall asleep. In doing this, the person reduces the effort they spend on sleeping, whilst still maintaining their commitment to improving their sleep practices. It is precisely this absence of effort that helps good sleepers to sleep easily.

The most challenging part of a CBT programme for insomnia is sleep scheduling. This involves keeping a strict discipline for going to bed and getting up. The first part of this is stimulus control, which relates to thoughts and feelings about sleep⁸¹. This is based on the idea that people respond to certain cues (stimuli) and behave in a certain way. In the case of insomnia, the problem is that when the person thinks of 'the bedroom' they immediately begin thinking about sleepless nights. The bedroom should be a place that is associated with sleeping, not with sleepless nights.

Therefore it is better, if possible, to watch TV, eat and do other activities in another room. If you are in bed but not feeling sleepy then it is better to get up, leave the room and engage in a relaxing activity elsewhere, returning to bed only when you feel sleepy. One exception to this is sexual activity. Spending long periods of time in bed without falling asleep runs the risk of strengthening the association between the bed and sleeplessness. This ultimately makes sleeping more difficult. At first it may seem counterproductive to get out of bed so often, but in the long term it is helpful in controlling our psychological associations and therefore improving the chances of overcoming insomnia.

The other part of sleep scheduling is sleep restriction⁸². This is also challenging. A person with insomnia has developed a sleep pattern that is inappropriate for them. The aim of sleep restriction is to help establish new sleep patterns. Keeping a sleep diary is the first step; this will help to record the amount of time spent sleeping per night (for an example of a sleep diary please see the Appendix). It is then necessary to set a bedtime and a waking time based on the average amount of time spent asleep.

For example, if you get an average of five and a half hours sleep per night but need to rise at 7:00 a.m. for work, set the alarm for that time, and then go to bed at 1:00 a.m. every night. This leaves a six hour window for your new sleep pattern to slot into. After a period of time, you may be successful in sleeping within that six hour window. The window can then be gradually increased, so go to bed at 12:45 a.m. instead. Sleep restriction is perhaps the most challenging technique championed in CBT for insomnia, and is difficult to practice and maintain without the help of a specialist practitioner.

There is substantial evidence from numerous high quality clinical studies to show that CBT is effective for insomnia^{83 84 85 86}. Furthermore, the scientific literature around CBT and its effectiveness has been systematically reviewed or meta-analysed nine times in the past 15 years. Reports by the American Academy of Sleep Medicine have revealed that across 85 clinical trials (and 4194 participants) CBT was associated with improvement in 70% of cases^{87 88}.

This improvement is long lasting, and it is therefore useful to treat chronic insomnia with CBT. NICE⁸⁴ has recognised CBT as an effective treatment for insomnia, although there is no guidance specifically written for this purpose. However, a full course can be intensive and may involve substantial amounts of work and discipline. This may be off-putting for some people with insomnia; however, there is some evidence to suggest that as few as four CBT sessions are effective for simple cases of insomnia⁸⁹.

Stepped care models of providing appropriate services have been recommended to improve people's sleep quality. These models involve making simple interventions (e.g. booklets, internet) widely available, using trained therapists for cases at an intermediate level, and involving sleep specialist psychologists for the most complex cases⁹⁰. Certainly, it has been known for some time that people seem to prefer the idea of psychological therapies to medication for insomnia⁹¹.

CBT was associated with improvement in 70% of cases.

Case Study

T* is a GP from Scotland who has suffered from bouts of depression. Because of his work commitments, T often doesn't get enough sleep, though he always managed with "catch up" nights. This past autumn, T* found himself struggling to fall asleep. To remedy this he would get up and watch TV downstairs until he felt sleepy. After a few weeks, he was getting up and going back to bed all night, only being able to fall asleep around 4 or 5am in the morning.

T*'s GP switched his antidepressant medication to one that had sedative properties but in spite of increasing doses and the addition of a benzodiazepine hypnotic, T*'s sleep did not improve.

After not much success with medication, T* consulted a sleep specialist, who recommended he stay up until 3am, then retire to bed and wake up at 10 a.m. It was the sleep specialist's belief that T* had upset his 'body-clock', his natural circadian rhythm for sleep. At the same time T* began reading a self-help book on insomnia which was based upon CBT methods⁹³. He discovered that part of the reason he may have formed his sleep pattern was that it allowed him to have some time to himself, which normally he didn't have in his busy day.

This realisation, combined with a tailored sleep regime of gradually bringing forward his bedtime meant he returned to a normal sleep pattern within a few weeks. T* also made adjustments to his daytime commitments and the stress he felt when going to bed disappeared. T* has incorporated what he learnt from his own experience when dealing with patients who have sleep problems. This includes using sleep diaries as well as providing general sleep education.

**‘Sleep is the golden
chain that ties
health and our
bodies together.’**

Thomas Dekker

sleep

sleep

sleep

sleep

Conclusion

Sleep is a much more complex process than many people realise, but it is crucial to the health of us all. It is not merely an inconvenience on busy waking lives. The link between sleep and health is two way.

The Great British Sleep Survey data indicate the extent to which poor sleep can negatively impact on people's daily lives, with inevitable consequences for mental health. People who are suffering the effects of low mood, who have less energy to take exercise, or are experiencing difficulty in personal relationships are more likely to develop mental health problems. The consequences of chronic insomnia should therefore be treated with these risks in mind.

Furthermore, poor sleep and insomnia are not always treated in accordance with the best current knowledge. In clinical practice, medication is more commonly prescribed for insomnia than CBT, although CBT is more effective in the long term. CBT is sometimes seen as difficult to access due to its relatively high cost and because of the lack of trained therapists available.

The IAPT programme may have the potential to address some of this need, if staff members are sufficiently trained to recognise and work with sleep problems. Current NICE guidance on the treatment of insomnia mentions the importance of psychological approaches, but the benefits of such approaches have not yet been expanded upon sufficiently.

The amount of evidence for CBT in the treatment of insomnia makes it difficult to ignore. It would appear that fitting such therapies into clinical practice relies upon employing a stepped care approach. Only the most severe cases of chronic insomnia need to be treated by a specialist sleep practitioner.

The majority of people who are suffering poor sleep might benefit from simple, non-intrusive methods such as a guided self-help book or course delivered over the internet. These kinds of interventions should be based upon the principles of CBT, but would be far more efficient in terms of health spending. There is already some evidence in favour of using simple, self-guided therapies to treat sleep problems⁹².

If a person with poor sleep finds such therapies to be ineffective, then primary care workers such as nurses or GPs should be able to give evidence-based guidance on how to improve sleep. Beyond this, graduate psychologists may be able to offer short CBT courses in an individual or group setting, and clinical psychologists might review more complex cases where there is an underlying mental health problem to be treated. There are several stages that can be tried before enlisting the help of a specialist sleep practitioner.

Poor sleep is a public health problem and needs to be taken seriously. It needs to be recognised within healthcare, education, and society at large. For society, it is vitally important that sleep is seen as a public health issue, much like diet and exercise. Sleep needs to be an issue on any public health agenda. If this does not happen, a great number of people will suffer the consequences, without reason.

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Key points

- Sleeping poorly increases the risk of having poor mental health. In the same way that healthy diet and exercise can help to improve our mental health, so can sleep.
- There is no universal answer to the question of how much sleep a person needs. This varies from person to person. What is important is that people find out how much sleep they need and ensure that they achieve this.
- The consequences of poor sleep should be taken seriously in healthcare, education, family life, and society at large.

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We recommend that

- The importance and benefits of sleep for both mental and physical health should be highlighted in national and local public health campaigns, including in schools and workplaces. New and easily accessible resources should be made available advising people what they can do themselves to improve their sleep.
- The Royal College of GPs should provide up to date, evidence-based training and information for its members on the importance and benefits of sleep for physical and mental health. GPs should also have access to a diagnostic tool for use in recognising sleep problems in primary care settings.
- The new Public Health Outcomes Framework should include a specific outcome on reducing sleep problems across the whole population. Sleep should also be reflected in new national mental health outcome indicators, including improving sleep for people who experience significant sleep problems requiring specialist help.
- The National Institute of Health and Clinical Excellence (NICE) should develop guidance for the management of insomnia using non-pharmacological therapies, to complement existing guidance on using pharmacological therapies.
- People with sleep problems should be recognised within the IAPT programme, especially regarding access to Cognitive Behavioural Therapy (CBT). IAPT staff should be suitably trained on sleep issues.
- Further research should be carried out to establish the effectiveness of low cost, non-intrusive CBT-based interventions for sleep problems, such as self-help books and online courses.

Useful resources

Sleepio

Sleepio is a new organisation dedicated to helping people sleep better. The Sleepio website includes info about various sleep problems and your chance to take part in the Great British Sleep Survey!

Website: www.sleepio.com
E-mail: hello@sleepio.com

Mental Health Foundation

The Mental Health Foundation promotes the impact of sleep on our mental health.

Website: www.mentalhealth.org.uk
E-mail: info@mhf.org.uk
Phone: 020 7803 1100

British Sleep Society

The British Sleep Society is a charity for medical, scientific and healthcare workers dealing with sleeping disorders in the UK.

Website: www.sleeping.org.uk
E-mail: enquiries@sleeping.org.uk

British Snoring and Sleep Apnoea Association

The British Snoring and Sleep Apnoea Association is a not-for-profit organisation dedicated to helping snorers and their bed partners improve their sleep.

Website: www.britishtsnoring.co.uk
E-mail: info@britishtsnoring.co.uk
Phone: 01737 245638

Self-help information

Espie CA (2006) *Overcoming Insomnia and Sleep Problems: A Self-Help Guide Using Cognitive Behavioral Techniques*. London: Constable & Robinson Ltd (Paperback).

Espie CA (2011) *An Introduction to Coping with Sleep Problems*. London: Constable & Robinson Ltd (Booklet).

Glovinsky P, Spielman A (2006) *The Insomnia Answer: A Personalized Program for Identifying and Overcoming the Three Types of Insomnia*. Perigee Trade.

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**‘Man should forget
his anger before
he lies down to sleep.’**

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Appendix: Sleep Diary

Working out the reasons why you might have problems sleeping can be difficult. Keeping a sleep diary, like the one on the next page, can help you keep track of when you slept well or poorly, and the possible reasons why that happened.

To complete the sleep diary, simply read the questions opposite and answer them in the appropriate space in the table. For instance, the answer to question A will be put in column A of the table next to the date of the sleep concerned. An example is provided on the first line of the table.

Remember, this diary is your personal record of how well you slept and why, so be honest!

This sleep diary has enough space for up to a week. Once you have completed it, you can download and print a new copy from our website: www.HowDidYouSleep.org

Questions for sleep diary:

- A How did you sleep last night?
- B What time did you go to bed?
- C Approximately how long did it take you to get to sleep?
- D How many times did you wake up during the night?
- E What time did you wake up?
- F How long did you sleep for in total?
- G What did you consume (if anything) within four hours of going to bed (e.g. cup of tea/coffee/ milky drink, glass of wine/beer, sleeping pills, dinner) and how long before bed did you consume it?
- H What was the temperature outside and in your bedroom?
- I What light sources were there when you went to sleep?
- J How much noise was there when you went to sleep?
- K What activities did you undertake before you went to sleep?
- L Any other comments?
- M How well did you feel throughout the next day (1= awful, 5= average, 10= perfect)? Include a description if appropriate (e.g. drowsy, grumpy, spaced out)?

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