

Lifestyle & Culture

What is sleep hygiene?



EMMA CAMILLERI



PROF. RENALD BLUNDELL

Sleep is a vital physiological process that plays a crucial role in maintaining overall health and well-being. Both oversleep and sleep deprivation can have significant impacts on various aspects of human functioning, including cognitive performance, physical health and emotional well-being. Additionally, the consumption of caffeine and alcohol can influence sleep quality and duration too.

What is sleep?

Sleep consists of multiple stages that cycle throughout the night. These stages are characterised by distinct patterns of brain activity, eye movements and physiological changes. The two main categories of sleep are non-rapid eye movement (NREM) sleep and rapid eye movement (REM) sleep.

NREM sleep involves three main stages. Stage 1 is the transition stage between wakefulness and sleep. It is a brief period lasting a few minutes. During this stage brain waves slow down and individuals may experience drifting thoughts or sudden muscle contractions (hypnic jerks). The first true stage of sleep then occurs in stage 2. It lasts for a significant portion of the sleep cycle. During this stage, brain waves continue to slow down and the body undergoes various physiological changes. Heart rate and body temperature decrease and eye movements cease. Sleep spindles (short bursts of rapid brain wave activity) and K-complexes (large, slow brain waves) may occur during this stage. Finally, stage 3 also known as slow-wave sleep (SWS) or deep sleep, is characterised by slow brain waves known as delta waves. It is the most restorative stage of sleep, crucial for physical restoration and recovery. During this stage, blood pressure drops, breathing slows and the body repairs and regenerates tissues, promotes growth and strengthens the immune system.

Following NREM sleep, REM sleep typically occurs and repeats several times throughout the night, with each REM period becoming longer. REM sleep is characterised by rapid eye movements, vivid dreaming and heightened brain activity. During REM sleep, the body undergoes several physiological changes. The brain becomes highly active, similar to when individuals are awake, with the exception of the paralyzed voluntary muscles. Most voluntary muscles become temporarily paralyzed, likely a mechanism to prevent individuals from acting out their dreams and potentially causing harm to themselves. Breathing also becomes faster and irregular, often resembling patterns observed during wakefulness. Similarly, heart rate and blood pressure, increases during REM sleep. REM sleep is also crucial for consolidating and processing information, enhancing memory and learning.

In summary, the sleep cycle typically consists of multiple NREM-REM cycles, with each cycle lasting approximately 90-120 minutes. As the night progresses, the proportion of time spent in REM sleep increases, while deep sleep (stage 3) decreases.

It is important to note that sleep stages

and their durations can vary among individuals and throughout different life stages. Additionally, disruptions in the normal sleep architecture, such as sleep disorders or external factors, can impact the distribution and quality of these sleep stages, leading to sleep disturbances and potential health consequences.

Why is sleep important?

Sleep is a fundamental physiological process that is essential for overall health and well-being. It plays a vital role in various aspects of human functioning, including physical health, cognitive performance, emotional regulation and immune function. As explained earlier, during sleep the body undergoes important restorative processes. Tissue repair, muscle growth and the release of growth hormones occur during deep sleep stages, promoting physical recovery and rejuvenation. In saying this, sleep is crucial for optimal cognitive performance, including attention, memory consolidation, problem-solving and creativity. It enhances learning and facilitates the integration of new information into existing knowledge networks in the brain. Likewise, sufficient sleep is essential for emotional well-being and regulation. It helps regulate mood, promotes positive affect and enhances emotional resilience. Sleep deprivation can lead to increased irritability, mood swings and reduced ability to cope with stress.

Additionally, during sleep, the immune system releases cytokines and antibodies that help fight infections and promote healing. Adequate sleep strengthens immune responses, while sleep deprivation can weaken the immune system, making individuals more susceptible to illnesses. On the same tangent, sleep is closely linked to hormonal regulation. The production and release of hormones, such as growth hormone, cortisol, insulin and leptin, are influenced by sleep patterns. Disruptions in sleep can lead to hormonal imbalances, contributing to metabolic disorders, weight gain and increased risk of chronic diseases.

In understanding the importance of adequate sleep, one can appreciate how several factors may influence our sleep quality and duration. The circadian rhythm is the body's internal biological clock, regulated by the suprachiasmatic nucleus in the brain. It controls the sleep-wake cycle. Light exposure, particularly natural daylight, helps synchronise the circadian rhythm. Disruptions to this rhythm, such as irregular sleep schedules or exposure to artificial light at night, can lead to sleep disturbances. Furthermore, factors such as noise, temperature, comfort of the mattress and pillows, and light levels in the bedroom can significantly impact sleep quality. Creating a dark, quiet and comfortable sleeping environment promotes better sleep.

Certain lifestyle habits can also influence sleep. Regular exercise, avoiding stimulants close to bedtime (for example, caffeine and nicotine), and establishing a consistent sleep routine can positively impact sleep quality. Conversely, excessive alcohol consumption, late-night eating and irregular sleep schedules can disrupt sleep. Moreover, stress, anxiety and other psychological factors can interfere with sleep. Racing thoughts, worry and emotional arousal can make it difficult to fall asleep or maintain sleep throughout the night. Relaxation techniques, stress management strategies and addressing underlying psychological issues can help



improve sleep.

However, sometimes certain factors are not easily modifiable. Various medical conditions, such as sleep apnoea, insomnia, restless leg syndrome and narcolepsy, can disrupt sleep. Identifying and treating underlying medical conditions is essential for optimizing sleep quality.

Thus, by understanding the importance of sleep and recognizing the factors that influence it, one can feel more encouraged to adopt healthy sleep habits and seek appropriate interventions when necessary.

The impact of oversleeping and sleep deprivation

Oversleeping, defined as consistently sleeping more than the recommended duration for one's age group, can lead to various negative outcomes. While the optimal amount of sleep varies between individuals, oversleeping is generally associated with several effects. Excessive sleep can impair cognitive function, leading to difficulties in attention, concentration, memory and problem-solving. Studies have shown that oversleeping is associated with decreased processing speed, reduced alertness and impaired executive functions.

Oversleeping has also been linked to mood disturbances, including increased depressive symptoms and higher rates of mood disorders. Individuals who oversleep may experience lethargy, low motivation and a general sense of malaise. These effects are thought to be influenced by disruptions to the circadian rhythm and alterations in neurotransmitter levels. Furthermore, prolonged periods of oversleep have been associated with adverse health outcomes too. Oversleeping has been linked to an increased risk of obesity, diabetes, cardiovascular disease and mortality. The mechanisms underlying these associations are complex and multifactorial, involving metabolic dysregulation, inflammation and other physiological processes.

On the other hand, sleep deprivation negatively impacts cognitive abilities, including attention, memory, decision-making and reaction times. The ability to concentrate and sustain attention on tasks is particularly affected, leading to decreased productivity and increased errors. It also compromises immune system function, making individuals more susceptible to infections and impairing the body's ability to mount an effective immune response, leading to an increased risk of elevated inflammation, contributing to the development of chronic diseases.

Lack of sleep is also associated with increased irritability, mood swings and emo-

tional instability. Chronic sleep deprivation is a risk factor for the development of mental health disorders, including depression, anxiety and bipolar disorder. Likewise, it can also lead to numerous physical health problems, including increased risk of obesity, hypertension, cardiovascular disease and diabetes.

The impact of caffeine on sleep

Caffeine, a widely consumed stimulant, can affect sleep in several ways. Caffeine reduces sleep latency, making it more difficult to fall asleep. It blocks adenosine receptors in the brain, preventing the build-up of adenosine, a neurotransmitter that promotes sleepiness. Caffeine consumption also disrupts the normal sleep architecture by decreasing the amount of deep sleep (slow-wave sleep) and altering the duration and intensity of REM sleep. This can result in a less restorative sleep experience.

Therefore, although caffeine may not significantly affect total sleep time, it can reduce sleep quality, leading to more fragmented sleep and increased awakenings throughout the night. This can result in feelings of tiredness and fatigue upon waking.

The impact of alcohol on sleep

Similarly, alcohol consumption can have complex effects on sleep patterns. Initially, alcohol can act as a sedative and facilitate sleep onset. However, as the alcohol is metabolised, its effects change, leading to disruptions in the later stages of sleep. Like caffeine, alcohol disrupts the normal sequence and duration of sleep stages, suppressing REM sleep and increasing lighter stages of sleep. This disruption can result in poor sleep quality and fragmented sleep. Thus, alcohol-induced sleep disturbances can lead to excessive daytime sleepiness, impaired daytime functioning and decreased cognitive performance.

Furthermore, chronic alcohol consumption can contribute to the development of sleep disorders such as insomnia, sleep apnoea and restless leg syndrome. These conditions further exacerbate the negative effects of alcohol on sleep.

A final word

In conclusion, sleep is a fundamental process that influences various aspects of human functioning. Oversleep and sleep deprivation can have significant detrimental effects on cognitive performance, physical health and emotional well-being. Furthermore, caffeine and alcohol consumption can disrupt sleep patterns and compromise sleep quality. Understanding the mechanisms and consequences of these factors is essential for promoting healthy sleep practices and optimizing overall well-being. Finally, further research is warranted to deepen our understanding of the intricate relationships between sleep, oversleep, sleep deprivation, caffeine, alcohol and their effects on human health. By promoting awareness of the impact of these factors on sleep, healthcare professionals and individuals can make informed decisions to ensure adequate and restorative sleep.

Renald Blundell is a biochemist and biotechnologist with a special interest in Natural and Alternative Medicine. He is a professor at the Faculty of Medicine and Surgery, University of Malta

Emma Camilleri is currently a medical student at the University of Malta