

Sleep



Sleep

What is it?

Sleep is characterised by i) a reduced environmental awareness and interaction, ii) lowered motor activity, and iii) partial or complete suspension of voluntary behaviour or consciousness (Redeker et al. 2004).

Sleep comprises two distinct physiological phases i) rapid eye movement sleep (REM) and ii) non-rapid eye movement sleep (NREM). NREM is sub divided into further stages. Stage 1 is where sleep is lightest. Stage 2 sleep has a higher arousal threshold, which means it is more difficult to be woken by internal or environmental stimuli, such as hunger or noise than in stage 1. Stages 3 and 4 are known as delta, slow wave or deep sleep. The cycle of NREM and REM sleep combined usually lasts 90 minutes. Typically, deeper stage 3 & 4 sleep happens in the first half of the night. The second half tends to feature REM sleep.

When we sleep is governed by an interaction process involving two different drives: a homeostatic sleep drive and a circadian wakefulness drive. In the evening both drives are high, however, the sleep drive continues to build while the wakefulness drive diminishes with the eventual result of sleep.

The Role of Sleep

Sleep is an important factor in many physiological and cognitive processes including neural development, learning, memory, cardiovascular and metabolic functioning. It is also very important for emotional regulation, where without it, we are more likely to experience feelings such as irritability, anxiousness, and low mood (Mukherjee et al. 2015).

Misconceptions about Sleep and Sleep Problems

Sleep myths are associated with greater inconsistency in bedtimes, more frequent napping, more in-bed activities, engaging in behaviours incompatible with sleep hygiene recommendations and perceiving fewer consequences of insufficient sleep (Pantescio and Kan, 2021).

Quality not quantity? Whilst short sleep duration (6 hours or less per 24 hours) is associated with adverse outcomes, there is no standard definition of what constitutes a 'normal' sleep. The amount of sleep we need varies across the lifespan, however for adults, it is suggested that the optimal sleep duration is between 7 to 9 hours (NICE, 2021).

Often short interruptions of sleep can be as problematic as prolonged periods of wakefulness because the NREM/REM sleep cycles are disturbed. It is therefore important to ask about sleep interruptions as well as the amount of sleep per night.

Sleeping less may wrongly be considered a natural part of ageing, however age is not a risk factor for insomnia (Ohayon et al. 2004). Fragmented sleep that is often experienced by older individuals is usually associated with age-related chronic diseases including coronary artery and pulmonary disease, and depression (Vitiello et al. 2002). It is therefore important to follow-up with any sleep problems reported, regardless of age.

Unrealistic expectations about an individual's sleep requirements and worry that these are not met can lead to, and perpetuate, insomnia (Carney et al, 2010). There are parallels here with anxiety and depression which may also be initiated and sustained by unhelpful beliefs (see Anxiety and Depression chapter).

Sleep Problems

A common problem among cardiac patients is insomnia, which may be defined as:

“Insomnia is difficulty in getting to sleep, difficulty maintaining sleep, early wakening, or non-restorative sleep which occurs despite adequate opportunity for sleep and results in impaired daytime functioning. Daytime symptoms typically include poor concentration, mood disturbance, and fatigue. Sleep disturbance in the absence of daytime impairment is not considered to be insomnia disorder.” (NICE, 2021)

The terms 'primary' and 'secondary' insomnia are no longer included in classification systems as insomnia is seen as a disorder in its own right – independent of, and in addition to comorbidities. Evidence has shown that associations between insomnia

and co-existing medical or psychiatric disorders are often bidirectional or interactive (NICE, 2021).

Insomnia is now categorised as:

- **Short-term:** Insomnia symptoms occurring for less than 3 months duration (typically a few days or weeks).
- **Chronic:** Insomnia symptoms occurring on at least 3 nights per week for three months or more.

Sleep Post Cardiac Surgery

Sleep patterns are often altered after cardiac surgery. These patterns mirror the signs of sleep deprivation: for example, less sleep, frequent awakenings and fewer full sleep cycles. Post surgery, people may find they sleep more during the day and less at night. Sleep normally improves by the end of the first week after surgery. However a systematic review of sleep patterns after heart surgery suggest that it takes approximately two months for sleep to return to pre-operational levels (Liao et al. 2011). Complaints of daytime sleeping at the expense of night-time sleep and sleep interruption are a more common feature post-surgery than problems of getting to sleep (Muthukrishnan et al. 2020).

Impaired Sleep: Contributing Factors

Over-arousal

Another reason for poor sleep is over-arousal. This can be caused by drugs such as caffeine or nicotine or by doing or watching something very exciting just before bed. It is important to wind down for about an hour before going to bed - listening to relaxing music, reading a newspaper or book, or watching something boring on the TV are all good ways of winding down.

Caffeine: is a stimulant and can disturb sleep patterns. There is a lot of caffeine in:

- Tea and coffee
- Cocoa and chocolate
- Cola and some other soft drinks

- Some over the counter medicines, like cold and flu tablets.

It can take between six to seven hours for caffeine to clear from the blood, and it is recommended to avoid after midday. More than six or seven cups per day of any of them may also cause strange feelings including palpitations, fear and chest pain.

If anyone has been drinking a lot of these for a while, they may experience withdrawal headaches if they stop drinking them straight away. People may feel a bit tired or restless or out of sorts once they cut down. These withdrawal effects are not serious and will pass within a couple of days.

Good alternative drinks are:

- Malty drinks like low fat versions of Ovaltine and Horlicks
- Herbal teas, peppermint, camomile or 'night-time tea' (available from health food shops).
 - It is important to check the caffeine level of herbal teas beforehand as some herbal teas can contain higher levels of caffeine than coffee.
- Water

Nicotine: As well as damaging health, cigarettes can also disrupt sleep as it is also a stimulant. It is advised to cut down the number of cigarettes smoked at least two hours before bed and not to smoke during the night.

It may be helpful to read more on smoking cessation, which can be found in the 'Predicting Cardiovascular Risk' chapter.

Alcohol: Alcohol is known as a depressant, and even a small amount can disrupt sleep. This is because as alcohol is absorbed into the body, mild withdrawal symptoms occur which makes us wake up or move us to a lighter stage of sleep. It is recommended to not drink alcohol within two of bedtime.

Pain – Post Operative

This can lead to disrupted sleep leading to excessive daytime sleepiness causing further night-time sleep disturbance. **This is discussed in greater detail in the 'Pain' chapter of the training folder.**

Environment

Noise, room temperature, air quality, lighting levels and mattress or pillow comfort are all known aspects of our environment that can affect our sleep, and sleep quality. Whilst these are perhaps worse in the hospital, they can be more easily controlled in the home. General recommendations suggest rooms should be ideally around 18C and having the window open for a short period before bed to promote sleep.

Worry

Another major reason for poor sleep is worry. This stimulates adrenaline, which, like caffeine, makes it hard to sleep. Worries may be about things that are happening in one's life, or they may be about getting to sleep.

Worry about sleeping: Usually this becomes a vicious circle. Thoughts like, 'I'll be exhausted in the morning', 'This isn't good for my health', 'I'll never get up', 'I'll be late for work', all make it harder to sleep. That means it takes longer, which increases the worrying thoughts and so on, and on, till one can feel quite desperate.

Strategies for Improving Sleep

Cognitive behavioural therapy for sleep problems

The cognitive behavioural approach to tackling sleep problems aims to:

- Address unhelpful thoughts and beliefs about sleep
- Provide sleep hygiene education
- Modify sleep behaviour including **sleep restriction** (behavioural instructions to limit time in bed to increase sleep drive and reduce time awake in bed) and **stimulus control** (to help the individual re associate the bed/bedroom with sleep and establish a better sleep/wake pattern)

Unhelpful Thoughts and Beliefs

Strategies that may help manage unhelpful thoughts and beliefs include:

- **Putting the day to rest:** Write down what happened during the day and how you felt about it. Make a note of any to do's that are left, along with your schedule for tomorrow. If you find yourself thinking about these types of thoughts, remind yourself you've already dealt with them. It might be handy to

keep a pen and notepad by the bed to note down any new thoughts whilst in bed to deal with tomorrow.

- **Thought-Blocking:** If you find yourself 'thinking about thinking' thoughts rather than worries, try repeating a word like 'the' every two seconds in your head with your eyes closed. Try and keep up repetitions for about five minutes.
- **Relaxation and Imagery:** These work as distraction techniques that can help bring a greater sense of being in control of our breathing, muscles and mind. In a systematic review of 17 studies, in all studies except one, progressive muscle relaxation training was more effective in reducing insomnia than placebo, wait-list controls, and no-treatment controls (Morin et al, 2006).
It might be helpful to follow along to guided tracks, like those on the Heart Manual Relaxation CD and App.

Sleep Hygiene Education

Sleep hygiene aims to increase awareness of behavioural, environmental, and temporal factors that may be detrimental or beneficial to sleep, as discussed above.

NICE (2021) outlines that this includes providing advice on the following:

- Normal sleep and changes in sleep patterns with age.
- Sleep environment.
 - A comfortable sleeping environment should be maintained: not too hot, cold, noisy, or bright.
 - The bedroom should only be used for sleep and intimacy.
 - Checking or watching the clock throughout the night should be avoided.
 - Bright light (including all technology) should be minimized. 'Blue light' displays on electronic devices and televisions suppress melatonin production — avoid using devices for two hours before bed.
- Regular sleep schedules including:
 - Going to bed when sleepy — avoid going to bed too early.
 - Waking up and getting out of bed at the same time every morning including weekends and after a poor night's sleep — increase exposure to bright light in the morning.
 - Avoiding napping during the day.
- Relaxation before going to bed (for example reading a book or having a bath).

- Relaxation exercises in the early evening may help reduce hyper-arousal.
 - Visual imagery in bed can help with racing thoughts.
- Limiting/avoidance of caffeine, nicotine and alcohol.
 - Caffeine should be avoided after midday and nicotine, alcohol, and large meals within 2 hours of bedtime.
 - Alcohol intake is a common maladaptive self-treatment strategy in insomnia which can contribute to poor sleep-maintenance.
- Exercise.
 - Exercise should be avoided within 4 hours of bedtime but is beneficial earlier in the day.

Modifying Sleep Behaviour

Sleep Restriction

It may seem counterintuitive to initially restrict the sleep of those who have disrupted sleep patterns at night, yet this is an effective behavioural intervention included in cognitive behavioural therapy (NICE, 2021). It is a process that involves creating new wake and bedtimes, monitoring, and gradually increasing time in bed over time. Self-help books are available, such as 'Overcoming Insomnia and Sleep Problems' by Professor Colin Espie. For further support, please contact your local sleep clinic and/or health psychology department for information about referral pathways.

Stimulus Control

Many people who experience insomnia, or struggle with their sleep, report how their bedroom becomes associated with wakefulness and frustration. Stimulus control attempts to change unhelpful associations that may have been made, such as eating, watching TV or using a mobile phone whilst in bed.

It is recommended that bed and bedroom is only to be used for sleep and intimacy. If it is difficult to fall asleep, or return to sleep within 20-minutes, get out of bed and only return when feeling sleep again.

How can the Heart Manual Facilitator Help?

Many people have improved their sleep dramatically using these methods, but they will not work instantly; they require patience and hard work. It can take many weeks to develop new sleep habits. If sleeping is a problem, the facilitator can help by finding out from the patient if it is a recent change to their sleep pattern, or if it has been an issue prior to the onset of their illness. If it is a long-standing problem, the patient should speak to their GP.

A sleep diary can help assess sleep difficulties and daytime impairment over time. It should be kept for two weeks and include the following:

- The time of going to bed and getting up.
- The time taken to get to sleep and the number and duration of episodes of waking through the night.
- Episodes of daytime tiredness and naps.
- Times of meals, alcohol consumption, caffeine consumption, and significant events during the day, such as exercise or stress.

Rating of sleep quality (ask the person to rate the quality of their sleep each night, from 1 to 5, where 1 is very poor and 5 is very good).

Sleep disruption may subside as the patient returns to their normal activity levels. Sleep problems can also be a symptom of anxiety and depression, so use a HADS assessment and refer to their scores and ask them about possible anxiety or depression (see Anxiety and Depression chapter).

References

- Liao, W.C., Huang, C.Y., Huang, T.Y. and Hwang, S.L. 2011. A systematic review of sleep patterns and factors that disturb sleep after heart surgery. *Journal of Nurse Research*, 19(4), pp. 275-288.
- Morin, C.M., Bootzin, D.J., Edinger, J.D. et al. 2006 Psychological and behavioral treatment of insomnia: update of the recent evidence (1998-2004). *Sleep* 29(11), 1398-1414.
- NICE, 2021. *Insomnia*. National Institute for Health and Clinical Excellence. <http://cks.nice.org.uk/insomnia>.
- Ohayon, M.M., Carskadon, M.A., Guilleminault, C. and Vitiello, M.Y. 2004. Meta-analysis of qualitative sleep parameters from childhood to old age in healthy individuals: developing normative sleep values across the human lifespan. *Sleep*, 27(7), pp. 1255-1273.
- Redeker, N.S., Ruggiero, J.S. and Hedges, C. 2004. Sleep is related to physical function and emotional well-being after cardiac surgery. *Nursing Research*, 53(3), pp. 154-162.
- Vitiello, M.Y., Moe, K.E. and Prinz, P.N. 2002. Sleep complaints cosegregate with illness in older adults: clinical research informed by and informing epidemiological studies of sleep. *Journal of Psychosomatic Research*, 53(1), pp. 555-559.
- Espie, C. 2010. *Overcoming Insomnia and Sleep Problems*. Robinson, London.
- Mukherjee S, Patel SR, Kales SN, Ayas NT, Strohl KP, Gozal D, Malhotra A; American Thoracic Society ad hoc Committee on Healthy Sleep. 2015. An Official American Thoracic Society Statement: The Importance of Healthy Sleep. Recommendations and Future Priorities. *Am J Respir Crit Care Med*, 191(12), 1450-1458.
- Pantescio, E.J. and Kan, I.P., 2021. False beliefs about sleep and their associations with sleep-related behavior. *Sleep Health*, 000, 1-9.
- Muthukrishnan, A., Muralidharan, T.R., Subash, J. and Lathamangeswari, C., 2020. Association of poor sleep quality with risk factors after coronary artery bypass graft surgery—a prospective cohort study. *Journal of Vascular Nursing*, 38(2), pp.83-92.