NORMAL SLEEP PHYSIOLOGY (ADULTS AND SENIORS)

Sleep is something that we all do as naturally as breathing and eating, from the time you formed in utero till the time you die. Yet scientists and doctors understand the physiology of breathing and eating far better than we understand the mysteries of the mind and body during sleep.

In the last 20 years however, we are beginning to understand far more about sleep, both the physiology of what happens as we fall asleep, and the pathologies that underlie conditions such as obstructive sleep apnoea and its contribution to morbidity and mortality.

Sleep is a period of time when the body rests. As you fall asleep, the brain begins to filter out sounds, sights and other sensory input from the surroundings. The muscle tone gradually relaxes, allowing the body to rest. Scientists divide normal sleep into several stages, using differences in the brain wave patterns and muscle tone to differentiate the stages.

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Stages of Sleep

Stage N1

This is a 'light' stage of sleep, where the brain's sensory input is shutting down, but you may still be able to hear and remember sounds and other sensory inputs from the surroundings.

It is common to drift in and out of stage N1 sleep before falling deeper into more consolidated stages of sleep. A sleep-deprived person may have episodes or microsleep where brief periods (a few seconds) of N1 sleep are interspersed during wake periods without the person being aware of this.

These brief periods of microsleep can be dangerous, for instance in a driver who 'switches off ' without realising it while driving. Many people who have trouble sleeping are actually drifting in and out of stage N1 sleep without realising it.

Stage N2

As you fall deeper into sleep, the filtering of sensory inputs intensifies. For instance, it will require a louder sound to wake you up from N2 sleep than N1 sleep. The muscle tone in the body drops and the body starts to become more relaxed .

When a person's brain wave activity is tracked as he falls asleep, certain characteristic patterns during this stage of sleep called spindles and K-complexes can be seen.

Stage N3

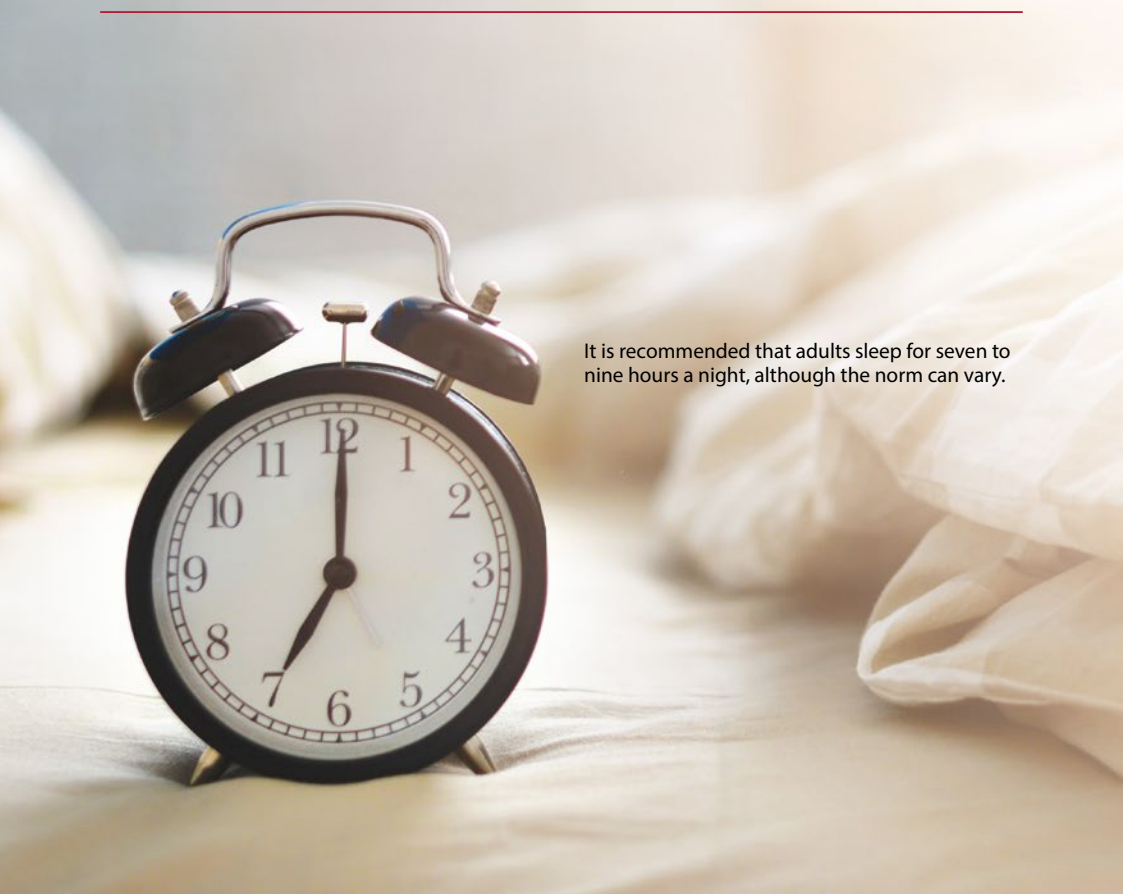
In this stage, you are deeply asleep. It takes more effort to wake you up from N3 sleep. On awakening at this stage you may report that you were having a dream, although the images and memories of dreams in N3 sleep are usually more indistinct.

REM Sleep

REM (RAPID EYE MOVEMENT) SLEEP

This is a very interesting stage of sleep, and usually occurs sequentially after you have gone through the first three stages of sleep. In this stage, your muscle tone is very flaccid, and the voluntary muscles e.g. arms and legs are essentially paralysed. However, there are bursts of eye movements during REM sleep, hence this is called rapid eye movement sleep. In this stage of sleep, both breathing and heart rate become less regular.

In people with underlying heart and lung disease, the oxygen levels in the body can fall to very low levels. Despite the inactivity seen in the muscles, there is actually increased brain wave activity, and when you wake from REM sleep, you may report very vivid dreams.



It is recommended that adults sleep for seven to nine hours a night, although the norm can vary.

HOW MUCH SLEEP DO YOU NEED?

It is recommended that adults sleep seven to nine hours a night. However, there is a wide range of normality with some people needing less than seven hours of sleep while others may need up to 10 hours.

Some epidemiological studies suggest that people who sleep too little or too much may have more medical problems or a higher mortality rate, although whether this is a cause or effect is debatable.

For most people, a clue to if you are getting enough sleep is whether you find yourself sleeping a lot more over weekends or on holiday, when you have less restrictions on when you need to get up. If you are sleeping a lot more whenever you have the chance, and you have a lot of lethargy or daytime sleepiness, chances are you are not sleeping enough to meet your body's requirements.

The quality of sleep also matters – in certain medical conditions and in certain sleep conditions, such as obstructive sleep apnoea, there is disruption in the sleep cycle, resulting in poor quality, unrefreshed sleep.

Over the course of a night, most people go through four to five complete cycles of sleep. **They drift from stage N1 to N2, to N3 sleep, into REM sleep, and then go back to N1 sleep again.** As the night wears on, the length of the REM sleep periods increases, with the longest REM sleep period often occurring just before they wake up.

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