

Teen creatures of the night



How does a teenager's use of electronic devices, at all hours of the day and night, affect their ability to get a good night's sleep?

Any parent of a teenager or adolescent child will tell you that trying to prise them away from a screen when they are mid-flight in sending a life changing message or viewing 'just one more' image on Instagram is nigh on impossible.

The language can be enough to make your hair curl and the conviction with which the device is clutched to the chest is little short of obsessive. Tablet devices are frequently finding their way into bedrooms and now many teenagers' beds are becoming floodlit with an eerie blue glow as tablets are hidden under sheets and doonas so they can be used at all hours of the night.

Bribes, threats and the tried and true 'if, then...' statements are wheeled out with little result. Nothing short of total removal of the device with a predictable breakdown in parent-child relations seems to yield any results. The alternative, which many families seem to prefer for the sake of some peace and quiet, is to simply roll over and permit 'access all hours'.

This is the reality for many Australian families in a growing trend towards personal devices becoming a part of the everyday fabric of daily life and it seems the collateral damage may well be the sleep patterns of our young people. Tablet devices are now becoming a part of the everyday school experience too, as more schools move towards 1:1 tablet use and trends such as BYOD (bring your own device) become more common.

But there is a growing body of research which is questioning the role that tablet devices play in determining the sleep patterns, or lack thereof, for this generation of adolescents who are the first to embrace tablet technology with such gusto.

So how much sleep is enough?

To get an understanding of how screen use might be impacting upon teen sleep patterns, it is important to understand exactly what we mean by 'sleep needs'. How much sleep does the average teenager really need? Does the need for sleep change as children move from childhood through the tween years (typically used to refer to the years from around 10 to 13) and into adolescence? Does it really matter if a teen does not get enough sleep?

According to the Better Health Channel website, teens generally need around nine to 10 hours of sleep a night. This is more than they need in childhood and also more than they will need once they become adults. However for most teens, what they need is quite different to what they actually get, with many only sleeping around seven to eight hours a night.

Whilst the occasional late night does not really do much harm, the difficulty arises when sleep is continually less than the brain and body really requires. Lack of sleep can lead to a state of constant sleep deprivation. This can cause physical (clumsiness, weight gain) and psychological problems (anxiety, stress, problems with concentration, increase in frustration) and can significantly impact upon the ability to function well at school.

Adolescence is a busy time, with sport, hobbies, social activities, school, homework and family responsibilities all competing for time and attention. It is little wonder that sleep is sometimes seen as the poor cousin to far more appealing activities!

Is all sleep the same sleep?

Sleep is not just something that happens when our heads hit the pillow at night. Sleep is divided into two distinct phases – REM (rapid eye movement) and non-REM sleep. There are four distinct phases to non-REM sleep, and these are essential for maintaining a system of balance within the body. It is during non-REM sleep that the body is able to repair itself and it is also when a growing hormone is produced, which allows children to grow and develop.

The body makes a gradual transition through the various stages of non-REM sleep, moving from sleepiness and drowsiness in Stage 1 through to Stage 2 where the heart and breathing rates slow down and finally to deep sleep in Stages 3 and 4 (also known as delta sleep) where the heart and breathing rate becomes very slow and muscles relax. The REM sleep phase is when we dream and it is thought that dreaming is important in helping us to learn.

REM sleep phases occur regularly throughout the night, around once every 90-120 minutes and make up around one quarter of the total night's sleep. Another important period of time to consider, especially when it comes to adolescents, is the period of time known as sleep latency – the time lag which occurs in between going to bed and actually being able to fall asleep.

For some people, this period of time becomes quite lengthy and can significantly decrease the amount of time they spent asleep in total. Being unable to fall asleep (having a long sleep latency) can cause stress and further decrease the likelihood of sleep happening easily.

We are probably all more creatures of the night and day than we think – our bodies are really programmed to switch off at night time when it is dark and turn themselves back on,

refreshed and reinvigorated, when it becomes daylight again. There are many factors which play a part in the process of waking and sleeping and one of the most critical ones is a substance called melatonin.

Melatonin is a hormone produced by the pineal gland in the brain and is important in controlling sleep patterns. The pineal gland is inactive during the day and becomes active at night time when it is dark. Melatonin levels increase significantly in the evening and help the body get ready for sleep. Increasing melatonin levels cause feelings of sleepiness. The big issue for teens is that melatonin is only produced when the light becomes low – the presence of bright light causes melatonin levels to stay low even if the body is otherwise ready for sleep.

Screens, activity, devices and sleep – what’s the link?

We know that the majority of adolescents use screens of some kind or another and that their usage is increasing. PCs, laptops, tablet devices, smartphones and the like are the stand-out feature of this generation of young people.

More than three quarters of Australian teens are using their devices for more than two hours on a weekday. American research found that a massive 97 per cent of teens reported that they had an electronic device in their bedrooms. The majority of adolescents report that they use an electronic device during the last hour before going to bed.

We also know that 82 per cent of teens are not getting the minimum amount of daily physical activity required for good health. Decreasing activity levels can further increase the difficulties experienced by many teens in getting to sleep as we know that physical activity is an important factor in promoting good quality sleep.

Teens who are active during the day are more likely to be able to fall asleep easily at night. Conversely, teens who are inactive are more likely to have trouble dropping off. The vicious cycle of not being active during the day and then using electronic devices at night feeds on itself and makes it harder and harder for the average teen to get a good night’s sleep.

At the same time as our young people are becoming less active and spending more time using screen-based media and electronic devices, we know they are also experiencing significant decreases in the length and quality of their sleep. Recent research on the average adolescent’s sleep behaviour shows that it is characterised by a late bedtime, a long sleep onset latency (SOL) and a short amount of time spent asleep (around six and a half hours) on weekdays.

This leads to an overall sleep debt of about two hours. The research also shows us that there is a clear link between the use of electronic devices and sleep behaviour – the two issues are not simply running parallel to each other. A review of the relevant literature shows that electronic media use has been consistently linked with delayed bedtime and shortened sleep. Research has also shown that using multiple devices (multitasking) has been linked with an increase in sleep latency and a decrease in overall time spent asleep.

What does not yet seem to be so clearly established in the research is whether there is a particular problem associated with different kinds of devices. Research in this area is

necessarily more recent, as brightly lit tablet devices which are typically used closer to the eyes than a PC or TV screen have not been a part of our daily lives for very many years.

In fact, the first of the current generation of tablet devices only landed on Australian shores in May 2010. Given how recently tablet-based technologies have been a part of our lives, it is not possible for longer term studies to exist which track the effect of these devices over time. In effect, it could almost be said that our young people are therefore becoming a generation of guinea pigs – conducting a widescale, all-encompassing trial on the effects of devices on their own sleep, behaviour and learning patterns.

Some recent research does shed some light on the effect of tablet devices on sleep patterns, compared the use of a regular print book with an e-book read on a light emitting tablet device. This study found that the participants who read an e-Book on a light emitting device took longer to fall asleep and had reduced evening sleepiness than the group who read a print book. They also experienced a decreased level of melatonin secretion and reduced next-morning alertness.

There was a change to circadian rhythms of more than an hour in the participants who were reading on the light emitting devices. It seems that there is a particular concern related to the short wave blue light emitted by tablet style devices. This light has been found to increase alertness and can be effective when used in daytime situations or where it is important that people remain awake and alert, such as shift workers at night time. However, the use of this light logically also makes it harder to fall asleep as it promotes wakefulness and alertness – the very things you don't want if you are trying to nod off at night.

It is important to consider that for this current generation of young people, tablet-based technologies have only been in regular use for a few years. We do not yet have large scale studies or long term studies available to guide their usage for the young people who are growing up using them on a regular basis.

Those children who were turning 13 and entering adolescence when the first of the popular tablet devices arrived in Australia are only just now reaching the age where they can leave school and enter the workforce or tertiary education. This is indeed the generation where we are learning just what the effects of screens and technology and their use is likely to be on the sleep of adolescents.

For now, perhaps the best advice is to support families in managing devices and technology and helping young people learn to limit their use and timing of their devices so they are able to get a good night's sleep and begin the next day feeling alert, energised and well rested.