VitaMins Health:
Sleep: Putting a number on slumber

What do the growing number of studies say about sleep and its impact on our morbidity and mortality?

Sleep…an altered state of consciousness which, despite presenting itself to us daily in a consistent and recognisable form, continues to be a subject of great uncertainty. What is the evolutionary purpose of sleep? What impact does “too much” or “too little” sleep have on our bodies? Exactly how much sleep is the right amount? Whilst many of these questions remain unanswered, researchers are offering persuasive evidence that taking our sleep seriously is far more beneficial to our health and wellbeing than many may have realised. Some studies have even shown increased mortality rates by up to 12% for those getting too little sleep and up to 39% for those getting too much!

A bit about sleep

Throughout the day, our bodies produce substances, such as Adenosine, which are widely believed to regulate sleep by increasing the pressure on us to fall asleep as they build up. During sleep, these substances dissipate, driving us towards wakefulness. In parallel, our body also works to a biological clock, or circadian rhythm, which acts to regulate and optimise the functionality of our bodies. This rhythm benefits most from us being awake during hours of sunlight and therefore it is activated and reset using light as a stimulus.

As we fall asleep, the pattern of sleep itself is also cyclical and there are four distinguishable stages to a regular sleeping pattern. We cycle through these stages every 90-110 minutes and we do so around 4-5 times a night. Each of these stages has its own recognisable features, one of which being the more well-known REM sleep, in which we experience our most vivid dreams.

In a system which is governed by a number of cyclical processes, it does not take too much for these cycles to become out of phase. For this reason, possible sources of interference such as shift work, jet-lag, exposure to bright lights or anxiety have become key areas of research.

What do the studies say?

A common approach to measuring sleep quality is to ask people to ‘self-report’ on how well they think they are sleeping. For example, the British Sleep Survey questioned over 5,000 individuals in 2013, asking them about their sleep habits. This study uncovered some surprising results (Londoners self-report as having the best sleep quality in the UK) and some less surprising (those without children sleep better than those with children).

This and many similar surveys have been used over the years as a basis from which to investigate the impact that sleep has on our bodies. There are several health issues currently associated with poor sleep quality, including stress, obesity, arthritis and diabetes. We touch upon some notable studies below which have examined the link between two topical sleep related behaviours and their associated health outcomes.

Sleep duration

There have been various studies seeking to uncover a link between health outcomes and sleep duration. A study by Kim et al in 2018 looked at stroke prevalence across a sample of Koreans, finding an increased risk of stroke in those with the highest sleep duration (9 hours or more). Most studies agree that both too little and too much sleep is associated with increased mortality, (see, for example

Jike (2018), Itani (2017) or Shen et al (2016)). Various explanations have been proposed, but there is uncertainty as to whether sleep is the cause, or whether the prevalence of other underlying conditions is resulting in sleep problems. Either way, many people are not getting the optimal amount of sleep. Current guidelines state that adults need 7-9 hours sleep a night. However, results from the British Sleep Survey showed that around 40% of individuals self-reported an average sleep duration of 6 hours or less (and 1% more than 9 hours).

Shift work

The USA-based nurses' health study has shown a significant association between increased levels of coronary heart disease (CHD) and rotating night shift work. However, broken sleep might not be the only reason for this association: a study using data from the Million Women Study found that UK women who had worked at night were more likely to be of lower socio-economic status, be current smokers and be obese, all risk factors associated with increased levels of CHD (and increased mortality).

Challenges for research and the potential impact of technology

As with other behavioural research topics, two key challenges exist:

- **How accurate is the data?** Much of this analysis is based on "self-reported" information which has the possibility of being inaccurate. The presence of such inaccuracies (or misestimations) will delay the identification of any definitive conclusions
- **Does correlation imply causation?** Is sleep a causal factor for poor health outcomes, a symptom of them, or both. What is the directionality of the association being observed?

Whilst data from a randomly controlled trial may seem like the gold standard, performing such studies en masse is not trivial and many individuals undertaking sleep studies do so because they already exhibit poor health or sleep quality. Despite this, observational studies have been of enormous benefit to us in the past. Furthermore, in a world where data is quickly dominating, everything we do is an act of self-monitoring (whether knowingly or otherwise). It will not be long before data gathered from our digital devices will monitor accurately our sleep behaviours and links to risk factors. In fact, it seems rather convenient that digital home assistants can be primed to wake us up in the morning, play us a bedtime story and buy us a packet of cigarettes all in one breath.

What does this mean for pension plans and insurers?

The current research shows that sleeping too much or too little is correlated with increased mortality. Any large changes to the sleeping patterns of the population could impact on general life expectancy and keeping an eye on studies like the British Sleep Survey could give early insights into upcoming longevity trends. Insurers moving to encourage and monitor various health behaviours (such as mobile apps featuring exercise goals) may well find further insight by including sleeping patterns in their approach.

Club Vita's top tips for sleeping well

If you think your sleep could be improved, here are a handful of tips from the Club Vita team:

- **Keep cool** – to fall asleep, our bodies like lower temperatures. 18 °C / 65°F) is optimal.
- **Keep regular –** maintaining a daily bedtime and waking time will assist your sleep (changing your sleep pattern at weekends, known as "social jetlag", can disrupt your circadian rhythm).
- **Limit caffeine and alcohol** – these uppers and downers disturb the cyclical processes which govern our sleep. Alcohol may appear to help you fall asleep, but actually just sedates you.

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