

Better Sleep

FOR BETTER HEALTH

Text by Prof Michael Chee



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In 2017, the RAND Corporation, a well-known non-profit think tank, issued two reports highlighting the public health relevance of short sleep. The first concerned the economic impact of poor sleep: around a 2% decrease of the annual gross domestic product of five member countries of the Organisation for Economic Co-operation and Development. The analysis was performed using sophisticated econometric methods based on public health and economic data. The second made a case for starting school later, following position papers from the American Academy of Pediatrics and Health Canada advocating for the same. Are these advisories relevant to Singapore?

Local studies back foreign recommendations

Starting from 2014, a Singaporean research team, which I have the privilege of leading, has been systematically collecting data on multi-night sleep restriction and its effects on cognitive performance and mood in a series of quasi-laboratory studies. We found that students from our world-topping, high-scoring Programme for International

Student Assessment do not perform optimally with six and a half hours of nocturnal sleep on weekdays – the average reported sleep duration of the secondary school students surveyed. Vigilance performance on this schedule was inferior to that obtained when a control set of students had the recommended nine hours a night of sleep opportunity. When restricted to five hours a night for five consecutive nights, students displayed cumulative declines

in vigilance, working memory, speed of processing and positive mood. Recovery of vigilance was incomplete after a simulated “compensatory” weekend of nine hours a night sleep. Of concern was that by the third day of a second consecutive cycle of sleep restriction, the decline in cognitive performance was compounded over the previous week’s deficits. Declarative memory encoding was compromised and sleepiness unsurprisingly increased all round. At this level of sleep restriction, a common reality encountered in short stretches by many of the “top students” was that an hour’s nap in the afternoon helped boost vigilance performance in the late afternoon and evening. However, there is no free lunch; data collected at the end of 2017 suggests that while a split sleep schedule benefits cognition, it does not ameliorate the hit on metabolic health that occurs with reduced total sleep over a 24-hour period. As such, recommendations developed in Western societies DO apply to our students.

An effective means of improving adolescent sleep is to start school later. There is incontrovertible evidence showing that on average, teenagers’ biological clocks are delayed towards a later sleep time. This, coupled with increased workloads, social activities and new-found personal autonomy, results in the shortening of nocturnal sleep. Many parents have asked for a later school start time but these appeals have, for the time being, been drowned out by strong status quo biases and misplaced beliefs about performance optimisation.

Despite the odds, Nanyang Girls’ High School rose to the challenge and made a series of adjustments to allow for the secondary school to start 45 minutes later without extending school hours. Even discounting the fact that some students could not benefit because their siblings started school at the usual time of 7.30 am, study participants averaged about 23 more minutes of time-in-bed on weeknights. That may not sound like much but it translated into statistically significant decreases in sleepiness and improved mood. Parents who responded to a survey mostly approved of the change in start time. The benefits of the change in start time were observed

at one month, as well as nine months post-implementation, debunking a popular notion that local students will simply go to sleep later (eroding the benefit of a later school start time), when provided the opportunity to do so after some months, or when the novelty of waking up later has worn off. Support of the programme by students, parents and teachers who were convinced of the value of a good night’s sleep to health, well-being and learning potential through multiple engagement sessions, may have made the critical difference in nudging these positive outcomes. There has been an unanimous agreement to continue the later school start time through 2018 and beyond.

Some persons have suggested that Singapore sits in an unfavourable time zone for students, such that it is relatively dark when students have to wake up for school. If anything, this should encourage the delay of school start times. In support of this statement, students in local international schools that start at 8.30 am on the average, report sleeping almost an hour more on weekdays compared to students in government schools.

While parents, as a whole, are supportive of the idea of improving students’ sleep, resistance to starting school later from a vocal minority might have contributed to policy inertia. One non-medical professor from the National University of Singapore weighed in with strongly negative views about starting school later, deriding the research results without cause. Another person wrote that some students have to wake up at 5 am to get to school from Malaysia and are doing “just fine” – a bold statement without empirical support.

Why does sleep matter?

A recent meta-analysis of global studies on short sleep and health assessed the risk of diabetes to increase by around 37%, obesity by 38%, coronary artery disease by 26%, and hypertension by 17% with short sleep. Multiply that by the number of persons exposed to short sleep on weekdays (80% of secondary school teenagers) and we get numbers that are quite alarming.

There is accumulating scientific evidence pointing to increased risks of cognitive decline and Alzheimer’s disease with shortened or fragmented nocturnal sleep. Experimental studies show that beta amyloid clearance is reduced in sleep-deprived persons and another study has suggested that tau aggregates can accumulate as a result of chronic sleep loss. An increasing number of longitudinal ageing studies now include sleep duration, quality and continuity in their data collection.

Primary insomnia, which is often precipitated by a stressful life event, appears to be getting more common in high-stress societies. However, the real figures in Singapore are hidden because many persons suffer in silence. Given that sleep deprivation is used as a form of torture, it is not difficult to imagine how successive nights of poor sleep can torment those suffering from insomnia. New data suggests that persons suffering from insomnia with objective short sleep will encounter faster cognitive decline.

Why the medical community needs to exercise leadership

Many of the young people who apply to my lab each year for project work on sleep recognise that they are not obtaining adequate sleep. Instead of proposing solutions to improve nocturnal sleep duration and quality, our high school students invariably propose “sleep pods with soothing music”, “novel aromatherapy” and “multi-phasic sleep”. These commercially oriented solutions omit any discussion of the biology of sleep need, are not fact-based and reflect the prevailing short-term Internet social media-fuelled mindset embraced by many young people today.

Although the scientific community has accumulated a wealth of empirical evidence for the benefits of sleep and health, many persons argue that they need to sacrifice sleep to build their careers and families and that they can “catch up” later. A recent study on exercise and cardiac health suggests that there is a limited time window beyond which commencement of exercise does not have benefit. This scenario might play out similarly for sleep as well.

Should we wait until obesity, diabetes, coronary heart disease and cognitive decline become more widespread before rallying the masses?

A better approach to performance optimisation

Is sacrificing sleep for achievement a worthwhile trade? *Citius, Altius, Fortius* (Higher, Faster, Stronger) goes the Olympic motto, and this ethos has spurred many generations towards greater effort for athletic excellence. No doubt, this philosophy has extensions to how we choose to allocate our work-life balance as well. Certainly, East Asians warmly embrace the notion that industry begets life success.

To a point, this works well. However, the importance of training smarter is now being increasingly recognised and was recently reiterated by a visiting Olympic swimming coach, who spoke of the need to inculcate the knowledge

of modern concepts of performance optimisation in local coaches. This approach is necessitated by an increase in overuse injuries and burnout among serious amateur and professional athletes. In the working world, *karoshi* does occur, as illustrated by high-profile cases from the finance and IT sectors in India and China, as well as from Silicon Valley and Wall Street. Singapore is not alone in its suffocating race to meet key performance indicators.

On a more positive note, careful management of one's body and schedule can yield stellar results. For example, professional tennis players are now able to sustain a high level of performance into their mid-thirties. Roger Federer, who just won his 20th Grand Slam, is a headline example, and there are many others. This is exactly what a progressive "smart" nation that is rapidly ageing should aspire towards – smart pacing to increase the likelihood

of sustained health and productivity into one's silver years.

The medical community has an obligation to review for itself the facts about sleep and health, and to advise the society at large about the same. We live in an era where commercial and political interests drive reality distortion to the point of absurdity. If those empowered with the knowledge and who have access to decision-makers do not speak out, who will? *Case in point: the child who traded his mother's savings for his leukaemia treatment on online games, without realising that his button presses to approve purchases of online time had real-world consequences, such as bankrupting his treatment fund.*

Make it your resolution to advocate for better sleep, for yourself and your family. Pitch for improved sleep in secondary school students. Sooner is better than later, before we all enter a nightmare from which there is no "reset" button... ◆