

COMMENTARY

SLEEP!

Persistent scientific enquiry is steadily stripping away some of the mystery associated with sleep, a universal behaviour which consumes one third of our lives. Indeed, we have to thank God for the efforts of these scientists, most of whose writings suggest that they might be atheists. A recently published book by Matthew Walker¹, a neuroscientist, titled - *Why We Sleep: The New Science of Sleep and Dreams*, summarises some of this fascinating, evidence-based information. This book is highly recommended for everyone – insomniacs, those who look after insomniacs, those who want to maximise their health and productivity, and those who desire little pearls for interesting conversations.

Subjectively, we know that during sleep, our brains lose contact with the outside world, and on waking there is a feeling of a time cavity. Dream-time is often prolonged relative to real time but at a non-conscious level, time continues to be catalogued by the brain with incredible precision.

The loss of consciousness in sleep bears a superficial resemblance to death, and there is no shortage of sayings linking the two phenomena: such as the popular Twi utterance, loosely translated, “is it because we will die that we shall not sleep?”

Sleep is, however, not just the absence of wakefulness but an exquisitely complex, metabolically active, and deliberately ordered series of unique stages with different benefits. These stages include light non-rapid eye movement (NREM), deep NREM and REM sleep.

Considering the associated loss of time and living activities, as well as the vulnerability to predators when asleep, it is clear that sleep must serve an absolutely vital function. Could sleep have evolved by natural selection or is it evidence of intelligent design? Perhaps a question for another time.

The documented benefits of sleep are numerous. It enhances memory, and the various stages, occurring at different times of night, offer different benefits. For example, during deep NREM sleep, which predominates early in the night, unnecessary neural connections are removed, making it easier for the brain to retrieve information. During the dreaming stage of REM sleep, which prevails later in the night, the neural connections that have not been removed are strengthened. Therefore, following a night of sleep you regain access to memories that you could not retrieve before sleep. Dreaming also provides benefits including mollifying of painful memories, and increased creativity by the provision of a virtual reality space in which the brain melds past and present knowledge. Sleep moves recently acquired fact-based

memories, stored in the hippocampus, to a more permanent, long-term storage location in the cortex, thereby freeing up short-term memory stores. Sleep therefore restores the brain’s capacity for learning, making room for new memories, and cementing newly learned information, preventing it from fading away.

Another benefit of sleep (stage 2 NREM) is the improvement of motor performance speed and accuracy without further practice. This is achieved by the transfer of motor memories to brain circuits that operate below the level of consciousness, so that the newly learned skills can be performed with less conscious effort. In other words, practice, followed by a night of sleep, leads to perfection.

Sleep helps in healing emotional wounds and in providing solutions to challenging problems. Various psychiatric conditions have been shown to benefit from improvements in sleep. After physical activity, sleep accelerates recovery from inflammation, stimulates muscle repair, and helps restock cellular energy in the form of glucose and glycogen.

Further benefits of sleep include healthier physical appearance, reduced food cravings, protection from cancer and dementia, resistance to colds and flu, reduced risk of cardiovascular disease and diabetes, emotional stability and better decision-making.

Therefore, along with a balanced diet and exercise, sleep should be considered a cornerstone of good health.

What are the effects of insufficient sleep?

The human mind cannot accurately sense how sleep-deprived it is when sleep-deprived. Objective impairment in brain performance is evident after sixteen hours of being awake. Sleep deprivation reduces the ability of the brain to retain new facts, and the learning restoration benefit is diminished when sleep lasts six hours or less. After a week of short sleeping, performance levels are not restored by three full nights of recovery sleep. The ability to concentrate is impaired by the slightest sleep deprivation. After being awake for nineteen hours, people who were sleep-deprived were as cognitively impaired as those who were legally drunk. Furthermore, the effects of the combination of sleep loss and alcohol are worse than additive. The under-slept brain is extremely emotionally labile; studies of adolescents have identified a link between sleep disruption and suicide. When sleep deprived, patients with epilepsy are more likely to have seizures.

Routinely sleeping less than seven hours a night demolishes the immune system and increases the risk of cancer. Less than eight hours of sleep a night, and

especially less than six hours a night, impairs exercise capacity and even sweating.

There are many ways in which insufficient sleep can literally kill. First, there is a very rare genetic disorder that starts with a progressive insomnia, emerging in midlife, and resulting in death after twelve to eighteen months of no sleep. Secondly, drowsy driving causes more vehicular accidents than alcohol and drugs combined. Drunken driving causes delay in braking and in making evasive maneuvers. But drowsy driving results in momentary lapses in concentration called microsleep during which the driver does not react at all. During a microsleep, the brain becomes unaware of the outside world for a brief moment, and the driver may have no awareness of the event. Less common but even more serious is when a driver completely falls asleep at the wheel.

There is currently no drug, device or any amount of psychological willpower that can replace the benefits derived from a full night of sleep. There are many tips on promoting sleep in Dr. Walker's book. They include sticking to a sleep schedule and getting rid of anything in the environment that might interfere with sleep, such as noises. Mere disruption of the depth of sleep, such as that caused by infrequent sounds, even without waking up the individual, may have similar effects on brain function as a whole night of sleep deprivation.

What are the implications for people in Ghana? There is much scope for research on the effects of our

very noisy environment and early waking (for long commutes) on the sleep, health and behaviour of Ghanaians². Perhaps, therein lies a possible solution to some of the problems in this country – if the recommendations can be enforced.

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References

1. Book Title – Why we sleep: the new science of sleep and dreams.
Author: Matthew Walker. Publisher: Penguin.
Date of publication: 28 September 2017
Language: English. 344 pages
Available from Amazon. Typical time to read - seven hours. Formats and Price: Kindle edition £9.99, Hardcover book £13.60. 67 customer reviews on Amazon: 4.7 out of five.
2. Study of noise levels in the city of Kumasi by Ebenezer Omari Abankwa
A Thesis submitted to The School of Graduate Studies, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana in partial fulfilment of the requirements for the degree of Master of Science in Mechanical Engineering. September 2014