



Better nights ahead

Ironic that something we spend nearly 30% of our lives doing is also one thing we never seem to get enough of: sleep. Modern life has made us busier than ever – our days longer and our nights shorter. Sleep is often one of the first things to go. But with 'sleep' research growing, maybe one day there will be better ways to improve the quality of our sleep, even if we can't increase the quantity.

Not long ago we awoke with the sun and went to sleep when it set – a rhythm that's still a part of our biology. But modern life doesn't make this easy. It puts more and more demands on our time and we're now sleeping less, and sometimes worse, than ever before.

"Sleep is essential for people's health," says Jim Horne, Director of the Sleep Research Centre at UK-based Loughborough University and author of *Sleepfaring: a journey through the science of sleep*. "The consequences of sleeping too little or not getting quality sleep are well documented."

Taking a toll

Even though it's been proven that sleep is vital to our health and well-being, it still seems to be one of our lowest priorities.

This can take quite a toll on our bodies in a number of different ways. Lack of sleep – especially on a regular basis – is associated with long-term health issues, including chronic conditions like heart disease.

Several studies have linked insufficient sleep and weight gain. Studies show that people who habitually sleep less than six hours per night are much more likely to have a higher than average body mass index (BMI). During sleep, our bodies secrete hormones that help to regulate appetite, energy metabolism and glucose processing. Lack of sleep or poor quality sleep can upset the balance of these hormones.

Recently, researchers from the University of Warwick and University College London, both in the UK, found that the

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lack of sleep can more than double the risk of death from cardiovascular disease. Study author Francesco Cappuccio, from the University of Warwick Medical School, notes, "Fewer hours of sleep and greater levels of sleep disturbance have become widespread in industrialized societies. Sleep represents the daily process of physiological restitution and recovery, and lack of sleep has far-reaching effects. Short sleep has been shown to be a risk factor for weight gain, hypertension and Type-2 diabetes, sometimes even leading to mortality."

Shorter night, shorter life

Another study at the US-based University of Chicago Medical Center showed that 27% of people who slept less than five hours a night had calcified arteries compared to just 6% for people who slept more than seven hours. Eve Van Cauter, professor of medicine at the University of Chicago, notes, "Metabolic and endocrine changes resulting from a significant

sleep debt mimic the hallmarks of aging. We suspect that chronic sleep loss may not only hasten the onset but could also increase the severity of age-related ailments such as diabetes, hypertension, obesity and memory loss."

Considering the many potential adverse health effects of insufficient sleep, it's not surprising that poor sleep is associated with lower life expectancy. Data from three large epidemiological studies reveal that sleeping five hours or less per night increased mortality risk from all causes by around 15%.

Sleep on it

Lack of good quality sleep can affect us mentally as well as physically. A study from the US-based University of Pennsylvania School of Medicine demonstrated that cognitive performance shows a definite decline with six or less hours of sleep. And nearly everyone has experienced the fatigue, increased stress, anxiety and lack of focus that can follow a night of bad sleep.

More

Good night, good temperature

Ever wonder why it can be so hard to sleep well when it's either very hot or very cold in the room? Well, there's a good reason, explains Roy Raymann, Philips Research. In daily life, the temperature distribution in your body varies over the day. A body's core temperature has a range of about 2°C, while skin temperature can vary by 15°C, due to weather conditions. In the evening, core temperature drops while skin temperature is relatively high.

For many years, researchers assumed that the drop in core temperature in the evening was the most important signal to the body to begin the process of sleeping. However, recent research has shown that skin temperature may play an even more important role. "To be able to sleep well and sleep through the night, warm skin is important," explains Raymann. "The optimal combination for sleep is a higher skin temperature and a lower core temperature."

One way the human body promotes this delicate balance is by producing melatonin when it gets dark. This hormone helps enlarge the blood vessels in the skin, allowing more warm blood to flow through, causing a rise in skin temperature. Through heat exchange with the environment, body core temperature drops. At dawn, melatonin production stops, so core temperature rises again.

This is the natural process for the sleep and wake cycles. But if there's a heat wave, core temperature can't drop enough for a good night of sleep. In turn, when it's too cold in a room, skin temperature is not high enough. "The best solution is to heat up your skin without increasing your core temperature, possibly with mild warming," notes Raymann. "But this should be done gradually because any kind of rapid change will wake you up anyway, whether these changes are related to light, sound level or temperature."

Just as research shows the lack of sleep to be detrimental to our health and well being, studies also point to a number of benefits of sleep including a better memory and more positive mood, a healthier immune system and even a slowing of the aging process. A study at the University of California San Diego in the US even showed that the volunteers who entered the REM phase during sleep improved their creative problem-solving ability by almost 40%.

A good night's sleep

So with all the information about the importance of a good night's sleep, why aren't we sleeping better? Since it may not be easy to lighten our daily load to increase our hours in bed, one solution may be to improve the quality of the sleep that we do get. Philips Research is now focusing on this area with a new 'sleep enhancement' project, which includes a dedicated Sleep Experience Lab. The goal is to understand sleep patterns and then use the knowledge to create medication-free, innovative approaches that help enhance the quality of sleep and the sleeping experience as a whole.

"I've seen first-hand the impact of systematic sleep loss on health, well-being, quality of life, mood and performance," explains Roy Raymann, Senior Scientist and sleep expert at Philips Research. "We have to realize that sleep is needed for restoration. Along with healthy eating and regular exercise, sleep is part of a complete lifestyle that helps us maintain good health and well-being."

Sleep science is relatively new and the project is exploring different avenues for enhancing sleep. One initiative involves developing advanced sensors to pinpoint sleep issues and find ways to address these through biofeedback and audio and video interpretation. Other ideas include smart lighting solutions that could help reduce jet-lag, sound-masking technologies to help people sleep better and new ways to tackle insomnia, like relaxation aids and do-it-yourself cognitive behavioral techniques. Philips is also investigating lifestyle techniques like monitoring and coaching to improve sleep as well as ways to help people recover more quickly from short, disrupted nights.

As Raymann points out, "The study of sleep is still a young science and there is a lot to discover." But maybe one day there will be better solutions to help us sleep soundly through the night – and wake up more refreshed. ☑



The Wake-Up Light

A brighter day

For years, Philips has been researching the link between light and sleep, especially the affect of light on the circadian rhythm – our internal 'body clock' that regulates our awake/sleep cycles. Since we no longer awake and sleep with the sun, our circadian rhythm can be thrown off, decreasing the quality of sleep. It turns out that one of the most effective ways to reset the body clock is with light. To help address these body-clock issues, Philips has two products:

The Wake-Up Light

The Wake-Up Light (above) is a more natural alternative to an alarm clock that uses gradually increasing light to simulate dawn. Waking up to light helps stimulate biological processes that awaken the body, like shutting down melatonin production. This way our bodies wake up gradually versus suddenly when the buzzer goes off.

goLITEBLU

Over the years, dozens of studies have shown the effects and potential benefits of light therapy for those with mood, sleep and energy problems during darker periods. The Philips goLITEBLU (below) emits a blue light that research shows can activate the chemicals that help our bodies become active and energetic. It may even help us sleep better in the evening.

