

UNDERSTANDING SLEEP

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UNDERSTANDING SLEEP

Distributed in
THE TIMES

Contributors

Peter Archer
A bestselling author, specialist writer and editor. Formerly a staffer at the Press Association and a consultant with the US television network NBC.

Marianne Eloise
A writer covering technology, wellness, the internet and popular culture for outlets including *The Guardian*, *Dazed* and *Refinery 29*.

Cath Everett
A freelance journalist specialising in workplace and employment issues. She also writes about the impact of technology on society and culture.

Virginia Matthews
An award-winning journalist specialising in business, education and management, writing for national newspapers and specialist business titles.

Katrina Megget
A healthcare journalist and former editor of *PharmaTimes*, with bylines in *The Telegraph*, the *British Medical Journal* and *Chemistry World*.

Julie Penfold
A journalist specialising in health, wellbeing and social care. Her work has been published in a range of consumer and specialist magazines.

Raconteur reports

Lead publisher
Iman Gordon-Ffrench

Managing editor
Sarah Vizard

Deputy editor
Francesca Cassidy

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Neil Cole

Head of production
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Design
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Illustration
Nita Saroglou

Art director
Joanna Bird

Design director
Tim Whitlock

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BODY CLOCK

Bird-brain training

Night owls are at a disadvantage in a society that's structured for morning larks to prosper. Is it feasible for humans to reset their natural body clocks?

Cath Everett

Have you ever wondered why some people leap out of bed first thing in the morning, instantly ready to tackle the day ahead, while others only start feeling productive much later in the day? If so, you may be interested to know that much of the variance is controlled by genes – or, to be precise, a protein-coding gene called period circadian regulator 3 (PER3). This helps to regulate our body clocks, controlling the sleep/wake cycle or circadian rhythm.

Mutations in PER3 have led to the existence of “extreme larks” and “extreme owls”. These make up 27% and 9% of the population respectively, according to a 2018 study of 433,268 adults in the UK published by Kristen Knutson and Malcolm von Schantz in *Chronobiology International*. Most people, who sit somewhere along a continuum between these two chronotype groups, are known as “hummingbirds”.

Evolutionary psychologists posit that the emergence of larks and owls started as a tribal protection mechanism. Night was the most dangerous time for early humans. It made sense to have people who could stay alert, maintain the fire and keep watch overnight. They could then be relieved at dawn by the early risers.

An individual's chronotype can fluctuate with age. While young children and the over-60s would generally be described as larks, teenagers tend towards owlism before stabilising into their adult chronotype in their mid-20s.

PER3's influence doesn't fully account for how our body clocks are set. The suprachiasmatic nucleus – located close to the optic nerve in the hypothalamus region of the brain – also plays a role in regulating circadian rhythms by responding to light and darkness. This means that our circadian rhythms are affected by the varying lengths of day and night over the year too.

A third influence is our own habits. Dr Guy Meadows, clinical director and managing partner at the London-based Sleep School clinic, explains: “Our everyday behaviour also has a strong impact on our sleep/wake timing. This is especially true at a time when people are working longer and later, while exposing themselves to a lot of light-based stimulation from electronic devices for longer and later too.”

Although the times at which we are at our most effective are partly



gpointstudio via Shutterstock

genetically dictated, there is little acknowledgment of this factor in a civilisation that tends to be organised around early rising.

“Variations on the phrase ‘the early bird catches the worm’ can be found in every language on the planet,” Meadows says. “By contrast, there's a huge stigma associated with being a night owl, as we live in a world that is, completely erroneously, set up for those of us who fare better in the morning.”

While people are only just starting to appreciate that point, the Covid-19 lockdowns have actually helped some night owls who have been obliged to work at home. “The fact that they haven't had to get up early to commute means that they have been able to sleep in for a bit longer, which is more aligned to their natural rhythms,” Meadows explains. This idea of alignment is important. For people whose lifestyles aren't in harmony with their natural

rhythms, any resultant sleep deprivation can harm their mental and physical health. Their concentration and memory can suffer and they may be vulnerable to higher levels of stress and anxiety. They may also be at greater risk of heart disease and type 2 diabetes. Studies indicate that night owls are more prone to all of these problems.

While most people need between six and eight hours of sleep a night, as many as half of all people in the West are “out of phase”, according to Dr Sarita Robinson, deputy head of psychology and computer science at the University of Central Lancashire. This means that they're getting up before they want to or going to sleep later than they ought to be. This is usually down to the effects on the suprachiasmatic nucleus of the blue light emitted by computer screens and mobile phones.

So what can people, and night owls in particular, do to improve their wellbeing? Meadows' advice is to at least try to get the right amount of sleep most nights of the week.

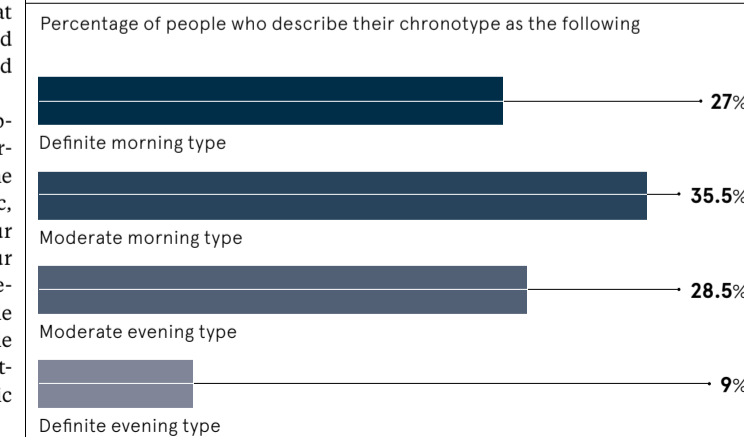
“Keep a regular wake/sleep cycle,” he says. “If you're incurring sleep debt from going to bed too late, take measures to repay it by retiring earlier or sleeping later once a week.”

Another thing that can help sleep-deprived people is the effective use of light, says Dr Lindsay Browning, author of *Navigating Sleeplessness* and a sleep ambassador for bed retailer And So To Bed. For night owls, this could mean opening the curtains first thing in the morning to get as much light into their eyes as possible. Doing so inhibits the production of melatonin, the sleep hormone, and activates cortisol, which makes them feel more awake. Sunrise alarm clocks, which wake people with a gradually brightening light, are a useful alternative during the darker winter months.

Meanwhile, larks who want to stay more alert in the evening should stimulate their brains with the blue light of an electronic device and refrain from dimming the lights in their homes.

Another option, Browning says, is for people to learn to work effectively with their own body clock and its natural peaks and troughs. “It makes sense for larks to perform important tasks early in the day and for owls to save more complex activities for later,” she says. “While you cannot change your chronotype, you can recognise what it is and so make your day work more effectively for you.”

A SIGNIFICANT PROPORTION OF THE UK POPULATION VIEW THEMSELVES AS 'EXTREME' NIGHT OWLS AND MORNING LARKS



Chronobiology International, 2018



HEALTH

Awake to the risks

There is an inextricable link between sleeplessness and ill-health for everyone, but research indicates that teens and over-65s who don't get enough sleep are particularly vulnerable to mental disorders

Peter Archer

We all understand that sleep is important for our mood, productivity and general health. But what we might not all realise is how serious the health ramifications of sleeplessness can be, particularly for teenagers and older people.

Researchers at the Brigham and Women's Hospital in Massachusetts found that a lack of sleep – defined as five hours or less a night – can double an individual's risk of dementia. Their study, conducted among 2,812 adults aged 65-plus, also found that those getting less than six hours' sleep were at greater risk of memory loss and difficulties with language and problem-solving compared with people sleeping for at least seven hours a night.

The researchers asked the participants questions covering aspects including quality of sleep, frequency of awakenings, incidence of snoring and regularity of naps. They then examined the links between these characteristics and outcomes including dementia and mortality.

Routinely taking 30 minutes or longer to fall asleep was associated

with a 45% greater risk of dementia. The researchers also found associations between difficulty in maintaining alertness, routine napping, poor-quality sleep or sleeping no more than six hours a night with an increased risk of premature death.

"Our results showed that, among all the characteristics, short sleep duration was the strongest predictor of incident dementia. The participants who were sleeping no more than six hours a night were at an elevated risk," says researcher Dr Rebecca Robbins, an instructor in medicine at Harvard Medical School and co-author of *Sleep for Success! Everything you must know about sleep but are too tired to ask*.

Sleep experts at the University of South Australia, Adelaide, believe that both healthcare professionals and parents need to improve their awareness of the relationships between sleep and mental health in teenagers. Dr Alex Agostini, a lecturer at the university, observes that sleep is especially important for people in this age group because they are going through a range of potentially stressful physical and developmental changes.

“We all accept that insufficient sleep is not good for our brain function – we understand that we may not perform well if we don't sleep well

A teenager regularly getting less than six hours' sleep a night is twice as likely as average to engage in risky behaviour such as dangerous driving and drug abuse, according to the researchers.

While studies show clear correlations between a lack of sleep and health problems, scientists acknowledge that establishing causal links is a harder task. Professor Derk-Jan Dijk is director of the University of Surrey's sleep research centre and a former associate neuroscientist at the Brigham and Women's Hospital. He observes that attributing causes for dementia, for instance, is a complex task, not least because of the possibility of reverse causality.

"If there is something wrong with a person's brain, it could affect their sleep," he explains. "But yes, extreme sleep patterns and disorders are associated with adverse health outcomes, including dementia."

Tim Beanland, head of knowledge management at the Alzheimer's Society, also observes that the

relationship between sleep deprivation and dementia is a complicated one. Different types of dementia are associated with different sleep problems, he notes.

"Researchers aren't yet sure which way the interaction goes – whether poor sleep causes or exacerbates dementia, or if dementia leads to poor sleep," Beanland says. "Some researchers believe that both could be true and the relationship could be circular. On top of this, the mechanisms that underlie all these interactions are unclear. More research is needed, particularly studies that observe large groups of affected people for long periods."

Recent research suggests that the glymphatic system – a network of vessels that clears waste chemicals from the central nervous system, mostly during sleep – may be disrupted by, and contribute to, some diseases of the brain.

Disturbed sleep is also a risk factor for numerous other health issues. Disorders such as sleep apnoea, when breathing repeatedly stops, may increase the risk of cognitive decline, while the impact of both very short and long sleep duration have been reported for many other adverse health outcomes.

Simply going to bed earlier may not be the answer to getting enough sleep, according to Dijk. He believes that the most effective solution is to find the "sweet spot" – the best time to go to bed for uninterrupted, high-quality sleep.

"We all accept that insufficient sleep is not good for our brain function – we understand that we may not

perform well if we don't sleep well," he says. "But there's no better way to ruin your sleep than by spending too much time in bed. For example, people who go to bed too early are likely to have their sleep interrupted."

Napping, while not always a bad thing, does not make up for a poor night's sleep, says Dijk, who adds: "There are certainly healthy nappers, but it would be a bit of a misrepresentation to say that napping is a good thing. Healthy older people should not be sleeping during the day. If you're doing that, you're not getting enough sleep at night or there's another health problem."

If napping is not the answer, could sleeping tablets be? Referring to another research project run by the Brigham and Women's Hospital team, Robbins suggests that the answer is no. In an analysis of medication usage among older people in the US, this study found that 15% of participants routinely consumed sleep medication. This usage was associated with incident dementia across the follow-up interval.

While people might be tempted to use weekends to catch up on their sleep, getting a regular seven-plus hours' worth is more important, particularly for teenagers, according to Agostini.

"There are so many reasons why it is healthier to minimise sleep loss by regularly going to bed a little earlier throughout the week than it is by trying to make it up over the weekend," she says. "I don't recommend a delay in wake times of more than an hour on Saturday and Sunday mornings. ●

POOR SLEEP AMONG OLDER PEOPLE INCREASES THEIR RISK OF DEMENTIA

45%

is the increased risk of dementia if it routinely takes someone aged 65-plus half an hour or longer to fall asleep

2x

Over-65s who regularly sleep less than five hours a night are twice as likely as those who sleep more than seven hours to develop dementia

Aging, 2020

POOR SLEEP AMONG TEENAGERS HAS AN EFFECT ON THEIR MENTAL HEALTH

2x

Teens are twice as likely as average to engage in risky behaviour if they regularly get less than six hours' sleep



University of South Australia, 2021



Commercial feature

Sleep demystified: How you can get a better night's rest

Fitbit sheds light on the complex world of sleep to help us understand how better nights can lead to better days

Stress and burnout are the curse of modern living. Tiredness and fatigue are common complaints, across all generations. So many of us long for a good night's sleep yet resign ourselves to beginning the next day at least as tired as we were before we went to bed.

But do we really sleep less than our parents and grandparents or is this just another urban myth? The reality is that we do not actually know, says Conor Heneghan, lead research scientist at Fitbit. There simply is not the data on sleep from earlier generations to prove or disprove this widely held belief.

Heneghan is helping to lead the development of research and innovation around sleep tracking and other physiological metrics using Fitbit technology. The company has tracked more than 14 billion nights of sleep since 2009 and has a wealth of information about sleep patterns.

"Conventional wisdom is that sleep has got worse," says Heneghan. "The problem with this is that so much of what we understand about the past is anecdotal, so it is not very clear."

We attribute perceived poor sleep to 24/7 modern lifestyles, including ever-present lighting, internet connectivity, daily commuting to work and the pressure of deadlines. But pre-industrialisation getting a good night's sleep also had challenges

– uncomfortable bedding, livestock waking up, and demands of food gathering and herding. A study in the journal *Nature* conducted using sleep trackers on pre-industrial rural communities in Africa shows highly disrupted sleep patterns and low sleep duration.

Nevertheless, there is a lot of pressure on sleep now, Heneghan says. "This is because we might be committed to getting to work early or to studying hard for qualifications to get ahead. It can feel relentless."

Lockdown and home working during the pandemic have certainly made us feel more tired; the pressure of holding it together has been overwhelming, at times. Yet Fitbit's data suggests that variations in our sleep patterns have not been quite as pronounced as we might expect. Its research in the US conducted in April and May 2020 found that, on average, users were getting 20 more minutes of sleep per night compared to the same month a year earlier.

"Patterns shifted without the daily commute to work," says Heneghan. "But over time, this has come back towards the baseline as people adjusted to this new normal."

Moving forward, Heneghan expects our sleep patterns to be influenced by the decisions we take about returning to the office and whether we go back to a daily commute or continue working from home.

Of course, the big question is how many hours do we need for a good night's sleep? According to Heneghan, there is no one size fits all answer to this question. The NHS recommends between seven and a half and nine hours of sleep but there is a lot of genetic variability, and some people are fine with six hours, he points out. Margaret Thatcher was famously reported to only sleep for four hours a night, but this is certainly rare.

"There are very few people genetically capable of sleeping less than five hours a night," says Heneghan.

One factor that influences sleep is age. Fitbit data shows that as its users get older they sleep more lightly and get less deep sleep, decreasing from an average of 17% at age 20 to 12% at age

70. Aging is also linked to shorter time spans of sleep, although these changes are often considered normal and do not necessarily affect sleep quality or mean you could have a sleep disorder, according to the charity Age UK.

When it comes to gender, Fitbit's data shows that women tend to sleep approximately 20 minutes longer than men (an average of seven hours and 40 minutes, compared to seven hours and 17 minutes for men). They also have a marginally higher percentage of REM (rapid eye movement) sleep than men. REM sleep, which usually happens about 90 minutes after a person falls asleep, is important because it stimulates the areas of the brain that help with learning and is associated with increased production of proteins.

While modern lifestyles may have a negative impact on the quality of sleep, technology can bring benefits to how we address this issue. Before the launch of wearable devices, most sleep data – including quantity and quality of sleep – were only accessible via research in sleep labs, which is both costly and time consuming.

Fitbit uses a combination of the wearer's movement and heart rate patterns to estimate the duration and quality of sleep. Fitbit believes this information helps users better understand their sleep and how it impacts their overall wellbeing.

For example, variations in heart rate can be used to estimate time spent in light, deep and REM sleep. Fitbit creates a "Sleep Score" that reflects the quality of sleep each night, with this analysis of sleep data helping users better understand their sleep patterns and take steps to improve their sleep behaviour over time.

Armed with all this information about our sleep, what steps can we take to feel more rested and ready for work the next day? Heneghan recommends sticking to a routine that works for you: "Fitbit data shows that people with the most regular bedtime typically sleep longer. Keeping to a consistent bedtime

and wake time routine has been shown in our data to correlate with increased total sleep time and reduced wakefulness at night."

Sleep scientists also refer to a concept known as 'sleep hygiene', which relates to controllable factors that can help the body sleep. For example, a dark room is essential for the body to wind down as it stimulates the production of melatonin, a key hormone for helping you fall asleep. Artificial light and screens can offset the sleep cycle and confuse the body on when to go to sleep. Room temperature is also important, although people's optimal sleeping temperature will vary. To get a better night's sleep, turn down the thermostat slightly or use a fan to circulate air.

It is also important to be aware that while alcohol may help you fall asleep faster, it contributes to poor overall sleep because it has been shown to lead to lighter sleep in the second part of the night with increased wakefulness. Caffeine is also a well-known sleep disruptor because caffeine molecule shares a common pathway with adenosine, which is related to your overall sleepiness level.

Fitbit's data shows that wearing one of its devices can help consumers improve their sleep habits, which can in turn have a material and positive impact on their sleep patterns, says Heneghan.

"People use their Fitbit to calculate how many steps they take each day and try to do better. It is similar with sleep. It makes people think about their sleep and how it fits in with their overall wellness. It encourages a conversation with friends and relatives about sleep and what works for them," he concludes.

For more information please visit www.fitbit.com



SLEEP HYGIENE

Clean and serene

The stresses of the Covid crisis have caused many people to experience insomnia. Adopting some straightforward sleep hygiene measures could help them to solve this problem

Marianne Eloise

The pandemic has had a serious impact on our sleep. Many more people have found themselves tossing and turning in bed at night over the past 15 months. Even for those of us who can still drop off easily, sleep no longer feels as restful as it was.

Insomnia has become far more prevalent worldwide during the Covid crisis. In the US, for instance, the number of Google searches for the word increased by 58% during the first five months of 2020 (when compared with the average figure recorded over the equivalent period in the preceding three years) as the infection rate rocketed, according to *Science Daily*.

The first serious study into what experts have termed coronasomnia was conducted by two Canadian researchers in June 2020. Charles Morin and Julie Carrier found similarities between the effects of the pandemic and those of other traumatic events, such as wars and natural disasters, on people's sleep. "Such a stressful life event is likely to have impaired sleep and circadian rhythms," they concluded.

Once the Covid crisis starts to ease, sleeping patterns will probably still take some time to return to how they were before the pandemic. This means that many people will need to take steps to readjust and learn to implement better sleeping practices.

To understand how to sleep better, we first need to know the causes of insomnia. Dr Abhinav Singh, a doctor on the medical review panel for the Sleep Foundation, believes that both extrinsic and intrinsic factors have been at play.

Extrinsic factors include the reduction in exposure to sunlight resulting from the various lockdown restrictions that required many of us to stay at home for much of the day. This has altered people's circadian rhythms. A decrease in physical activity and even a loss of routine at mealtimes have also had a disruptive effect. Singh uses the acronym "Fedup" as a mnemonic

for the intrinsic causes. This stands for financial, emotional, distancing, unpredictability and professional/personal.

"All of these challenges have led to an increase in our production of stress hormones, which has further disrupted the onset and maintenance of sleep, reducing its overall quality," he says.

Stephanie Romiszewski, a sleep physiologist and director at the Sleepyhead Clinic, agrees that there have been several linked factors.

"Key things – including fundamental mood-boosters – that keep humans functioning well have been taken away. This has blurred the line between being awake and being asleep," she says, adding that the stress that people have been under hasn't just been personal. "We've also had something other than our usual troubles to worry about: a global problem that we haven't been able to escape."

Dr Neil Stanley, an independent sleep expert, says that the effects of poor-quality sleep should not be ignored. These include problems dropping off, feelings of fatigue on waking up, extended sleep during days off work, an inability to concentrate for extended periods and a lingering sense of irritability and/or restlessness.

While people cannot change many of their circumstances, they are able to optimise their sleep hygiene – a term coined in the 1970s to describe the behavioural and environmental steps that can be taken to address mild insomnia.

“Sacrificing sleep is like taking out a high-interest loan with steep repayments in the form of poor health and performance



58%

increase in the number of Google searches for 'insomnia' in the US during the first five months of 2020 compared with the average figure over the equivalent period in the preceding three years

Journal of Clinical Sleep Medicine, 2020

Experts do agree that discovering whatever approach works best for you, rather than following prescriptive actions such as the avoidance of certain foods, is the most straightforward way to get a better night's sleep. We are all different – a few of us operate best on six hours of sleep, while an evening bath might wake some people up rather than wind them down. Trial and error is the best way forward: keep a journal to track the quality of your sleep and which of your actions seem to have a positive effect on it. If certain measures clearly aren't helping, don't persist with them.

Although conventional wisdom states that cutting out technology before bedtime aids sleep, there are many mobile apps that promise to promote better rest.

"To a certain degree, sleep apps are fine," Singh says. "They tell me that the individual using them is starting to take their sleep more seriously and wants to know more. That's great. If they help to change the person's behaviour and expand their sleep opportunity to a healthy eight-plus hours, I'm all for them."

But he adds that moderation is key, as obsessing over statistics isn't healthy. Romiszewski agrees. "Ask yourself what you're achieving by monitoring your sleep. If you're using an app, ensure that you have a goal in place, along with strategies for achieving it. Don't track for the sake of tracking."

Many of us will still struggle to obtain enough high-quality sleep even after the pandemic ends. And, sometimes, good sleep hygiene will not be enough to solve the problem. Singh says that a good rule of thumb is that someone might need the help of a specialist if they are: struggling to sleep more than three times a week for longer than three months; experiencing "suboptimal daytime performance, fatigue, increased irritability, anxiety and mood disturbances"; and/or relying on over-the-counter medication or alcohol to sleep.

Romiszewski agrees. "If your sleep problem has been going on for longer than three months, it's time for you to enlist some evidence-based scientific support from an expert with the right qualifications and, most crucially, good clinical experience," she says.

This is important, because good sleep is integral to our wellbeing. "Sleep is one-third of your life. Compromising on it has significant consequences for the other two-thirds," Romiszewski says. "Sacrificing sleep is like taking out a high-interest loan with steep repayments in the form of poor health and performance." ●

Even during times of heightened stress, there are things that people can do to improve their chances of a restful sleep, says Singh, who has developed his own protocol, which he calls the four-play method. This involves performing the following activities for 10 minutes each before going to bed: take a warm shower, which helps "to cool the core and support the release of the sleep hormone melatonin"; write a journal entry, which helps to offload worries; read a book; and meditate.

He says that such a routine helps to condition the brain and body for sleep, especially when combined with other measures, including the avoidance of caffeine consumption and exposure to blue light within an hour of bedtime. Keeping the bedroom as dark as possible is also strongly recommended.

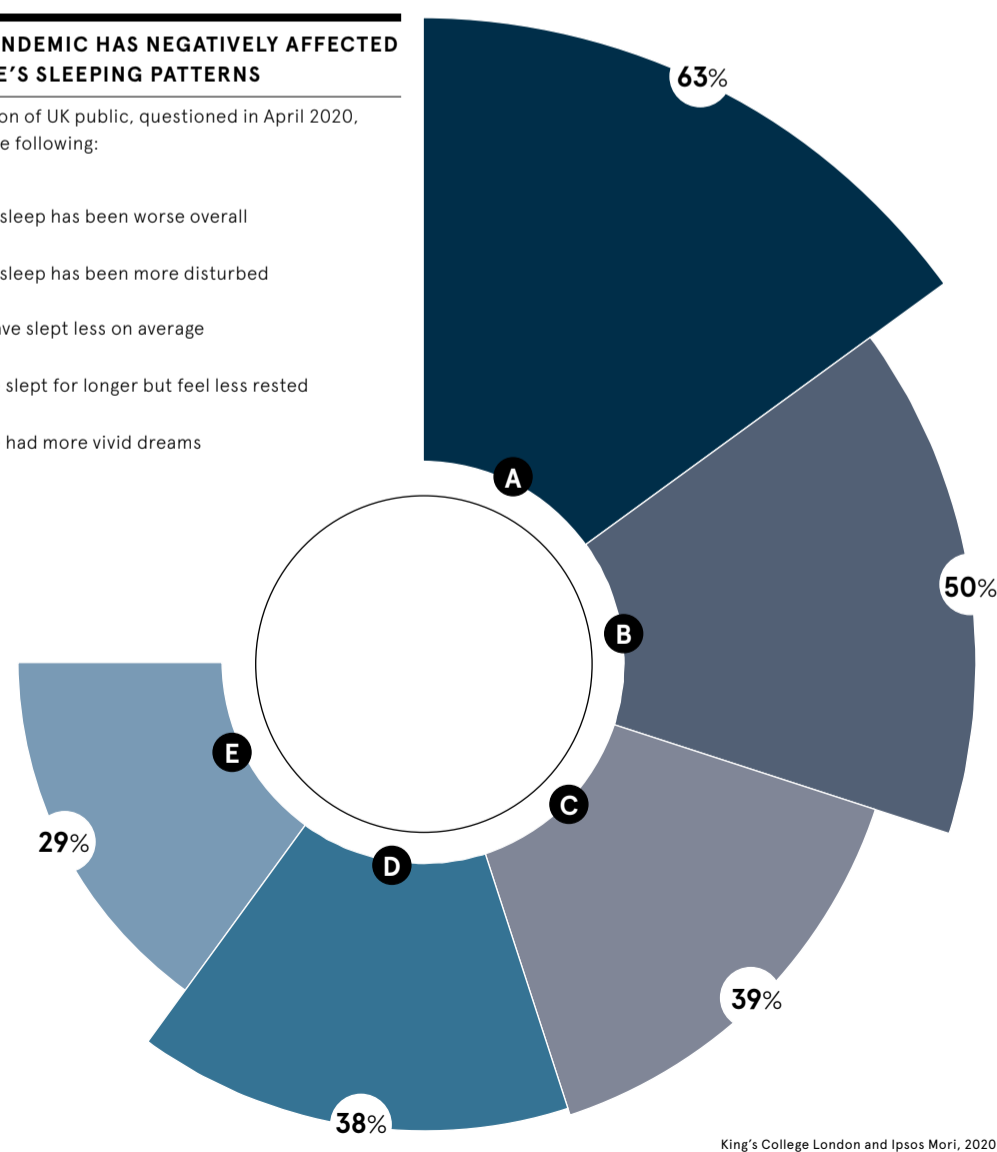
Romiszewski believes that following "obsessive ritualistic strategies" can actually do more harm than good, although she adds that "people have to do some consistent goalpost-setting that is influential to their body".

"Rising at the same time each day and getting plenty of exercise and exposure to natural light will positively affect a sleep problem far more significantly than, say, cutting out caffeine would," she says. "But give yourself permission to go to bed a little later if you aren't sleeping. The only way to induce sleep is by spending more time awake. Incurring mild sleep deprivation will boost the quality of your next sleep."

THE PANDEMIC HAS NEGATIVELY AFFECTED PEOPLE'S SLEEPING PATTERNS

Proportion of UK public, questioned in April 2020, saying the following:

- A** My sleep has been worse overall
- B** My sleep has been more disturbed
- C** I have slept less on average
- D** I've slept for longer but feel less rested
- E** I've had more vivid dreams



King's College London and Ipsos Mori, 2020



Finding the right sleep solution for you

Getting a good night's sleep takes more than simply closing your eyes. It requires the perfect levels of light, temperature and, most important of all, comfort, says mattress maker Silentnight

Move over complicated yoga poses and green smoothies for breakfast, a good night's sleep is rapidly becoming the biggest wellness goal. But if it's not just about closing your eyes and hoping for the best, what actually goes into eight hours of peaceful shut eye?

"When we talk about what creates a good night's sleep, we say that everyone needs a bit of TLC – temperature, light and comfort," says Silentnight's sleep expert, Hannah Shore. "Temperature is very important, we actually need to cool down our core temperature to fall asleep and encourage the release of melatonin, the sleep hormone."

"Light is huge too. Before electricity we used to sleep when it was dark but now we're in a 24-hour cycle of light, screens and phones, which discourage melatonin and keep us pumped with cortisone. And then there's comfort – and that's what we really focus on as a bed brand."

Silentnight, which has been creating mattresses for more than 75 years, is on a mission to improve the nation's rest. Taking its position as the UK's most trusted bed brand seriously, it has embraced the science of sleep, combining research with rigorous testing to create total sleep solutions to suit every sleeper.

"Historically, mattresses have been sold on spring counts," explains Shore. "People thought the more springs, the more expensive and better. But there's actually a lot of misinformation out there as to what kind of mattress suits what kind of person."

Silentnight has its own in-house testing lab – the only one of its kind in the UK – which it uses to make sure all its

products are just right. One of the trickiest parts of creating the perfect mattress is the fact that one person's comfortable is another person's sleepless night. "We do lots of research into comfort because it's so subjective," explains Shore. "We put some objective science behind the subjectiveness of comfort."

It turns out there's quite a lot at play when we find the perfect bed. Silentnight has delved deep into spine alignment, pressure points on a mattress and even the microclimate created under a duvet. All these things combine to give the company a complete understanding of what sleep solutions work for what kind of person and why, enabling them to provide solutions for every sleeper, to help them sleep soundly.

This is key because it turns out we need more support on this than you might think. "Our research found that when given the choice, 68% of people would choose the wrong firmness for their body shape," says Shore.

68%
of people would choose the wrong firmness for their body shape

450m
million plastic bottles have been saved from landfill every year

"Almost two in three (59%) of these people would choose a mattress that is too firm for them." This finding has strengthened the company's goal to work with individuals to find their unique sleep solution.

As well as ensuring the comfort of customers, Silentnight also encourages us to sleep more easily thanks to its award-winning sustainability programme. "We take it pretty seriously within the business," says Jason McIlvenny, senior brand and customer insights manager at Silentnight. "Over the past couple of years we've looked at more eco design principles – manufacturing and designing products with a view to reusing surplus materials, making recycling easy at our products' end-of-life and reducing landfill."

The company is carbon neutral, offsetting its emissions through partnerships with the likes of the Marine Conservation Society. It has also reduced its emissions by 31% over the past three years and its Eco Comfort range uses recycled plastic bottles to make the mattresses, saving an estimated 450 million plastic bottles from landfill each year.

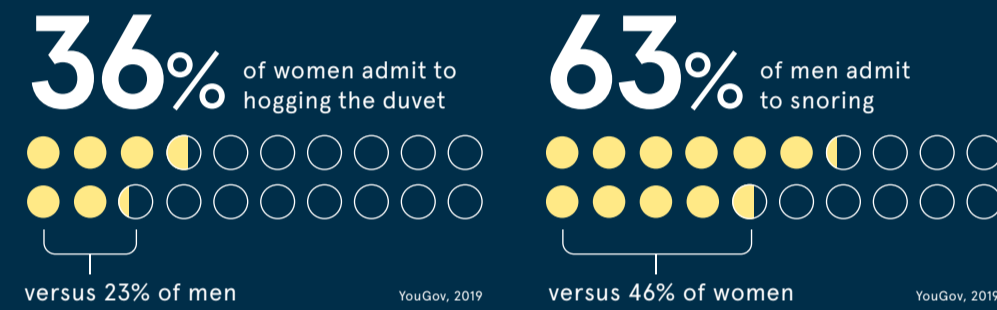
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THE NEED FOR SLEEP

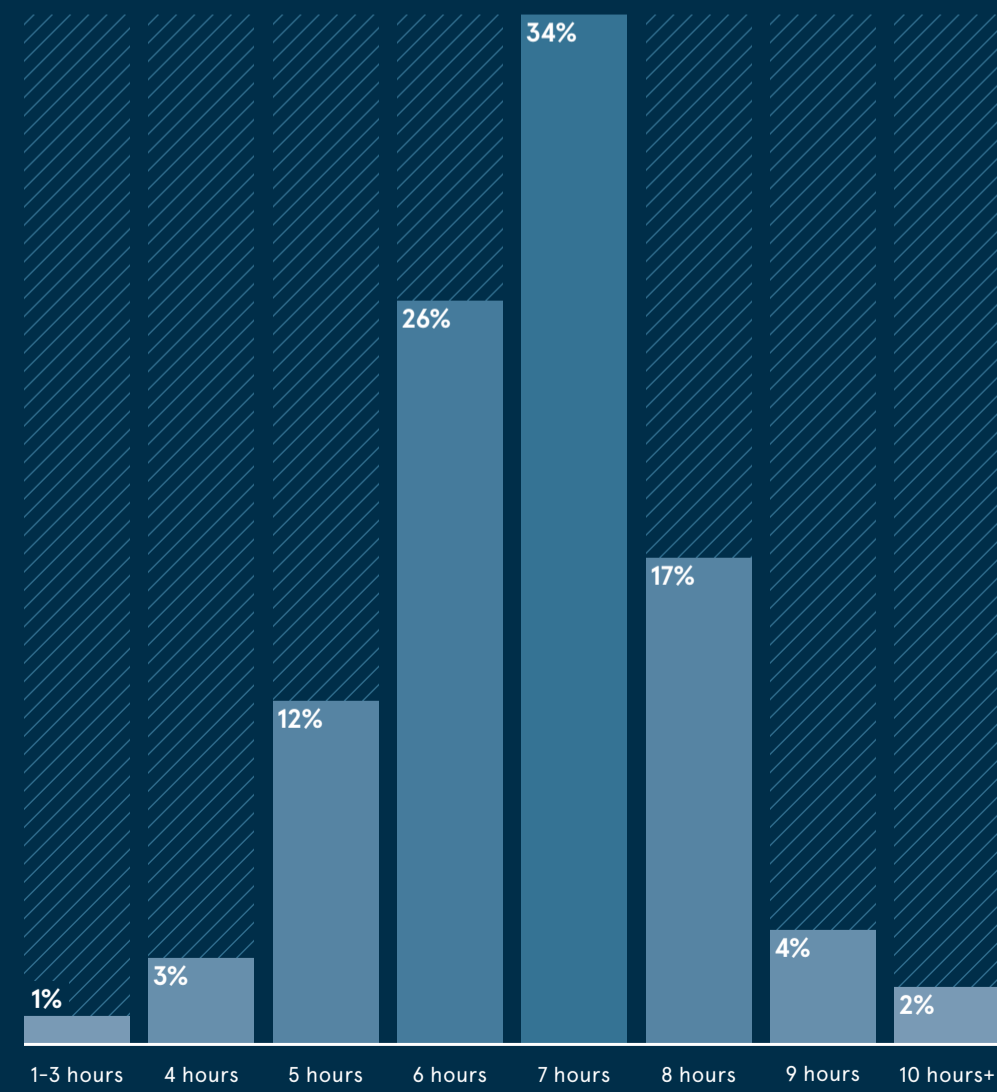
We spend up to a third of our lives sleeping, yet many of us struggle to get a decent night's rest. The Covid crisis has seemingly exacerbated the problem, so it's no wonder that the market for sleep and wellness products is set to soar as people seek new and ever more inventive ways to help themselves drift off



HOW MANY HOURS BRITONS SLEEP AT NIGHT

Average sleep per night in the week to 20 May 2021

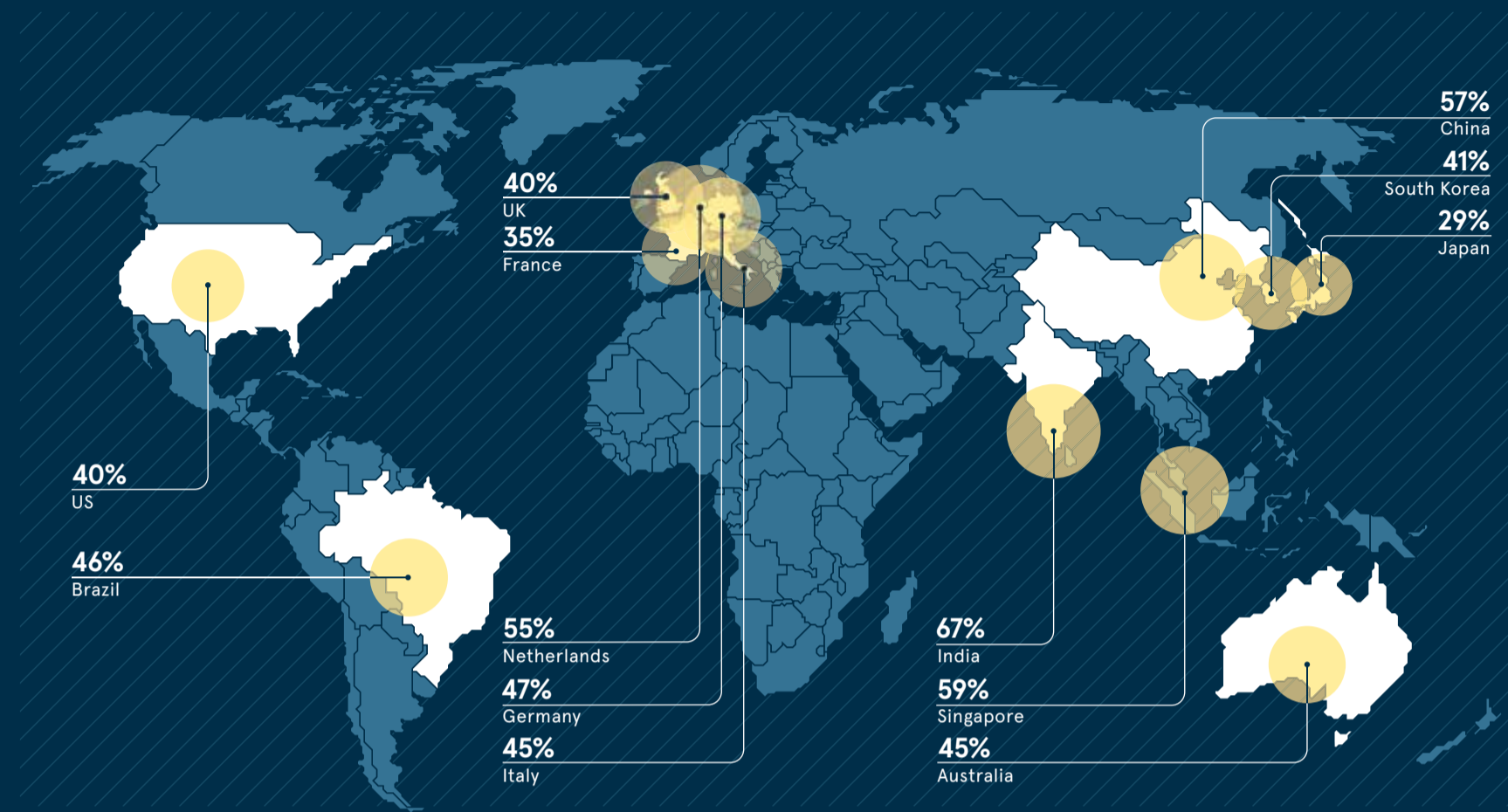
YouGov, 2021



MOST PEOPLE ARE NOT SATISFIED WITH THEIR SLEEP

Percentage of adults completely or somewhat satisfied with their sleep

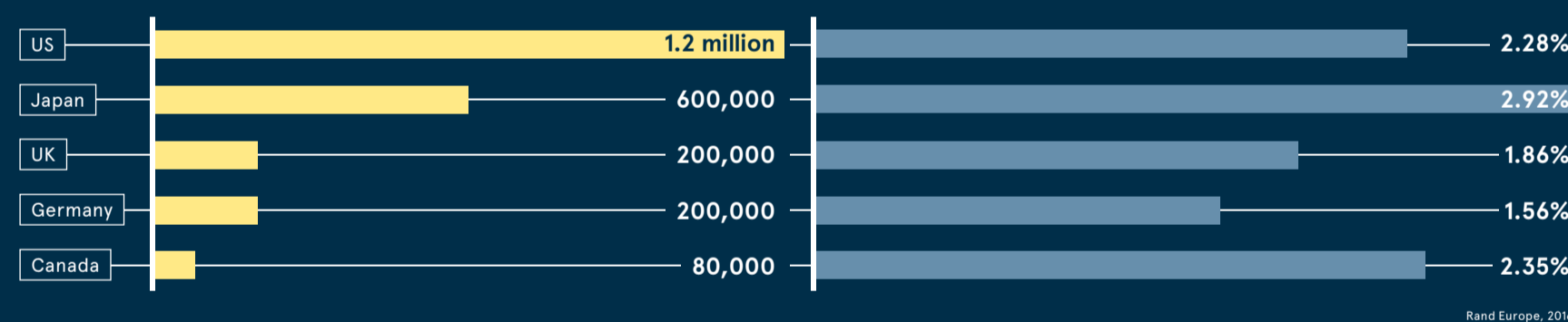
KJT Group, 2021



THE ECONOMIC COSTS OF INADEQUATE SLEEP

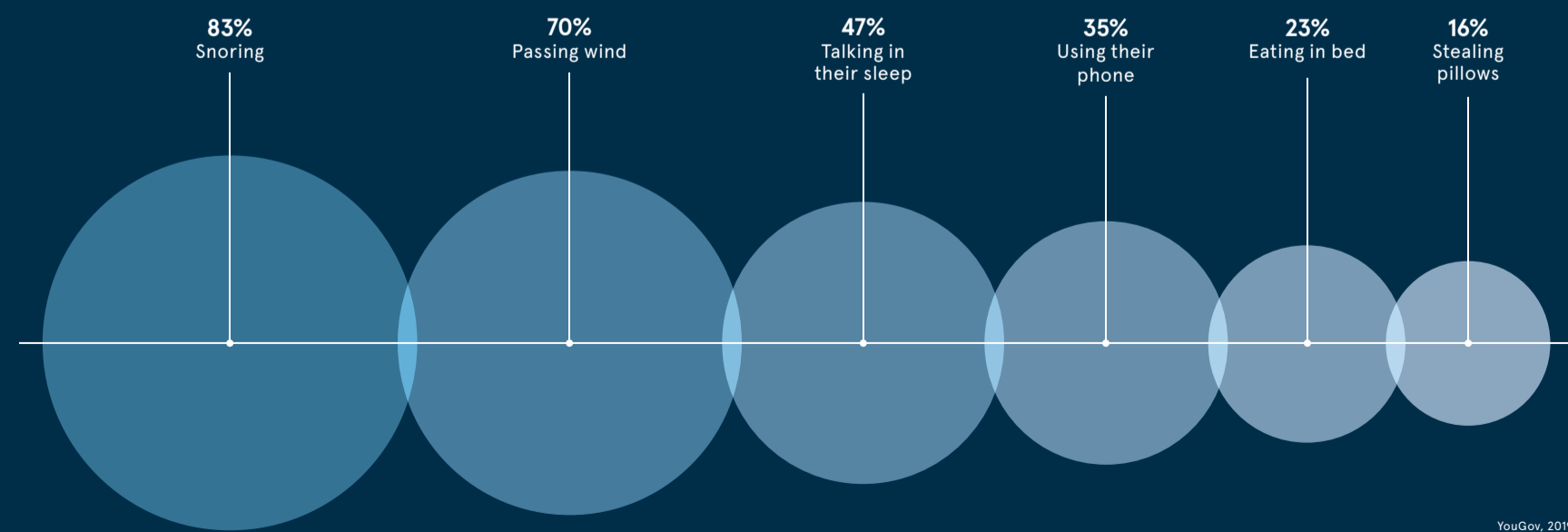
Annual losses in selected countries

● Working days ● % of GDP



SOMETIMES POOR SLEEP IS DOWN TO WHOM YOU SHARE A BED WITH

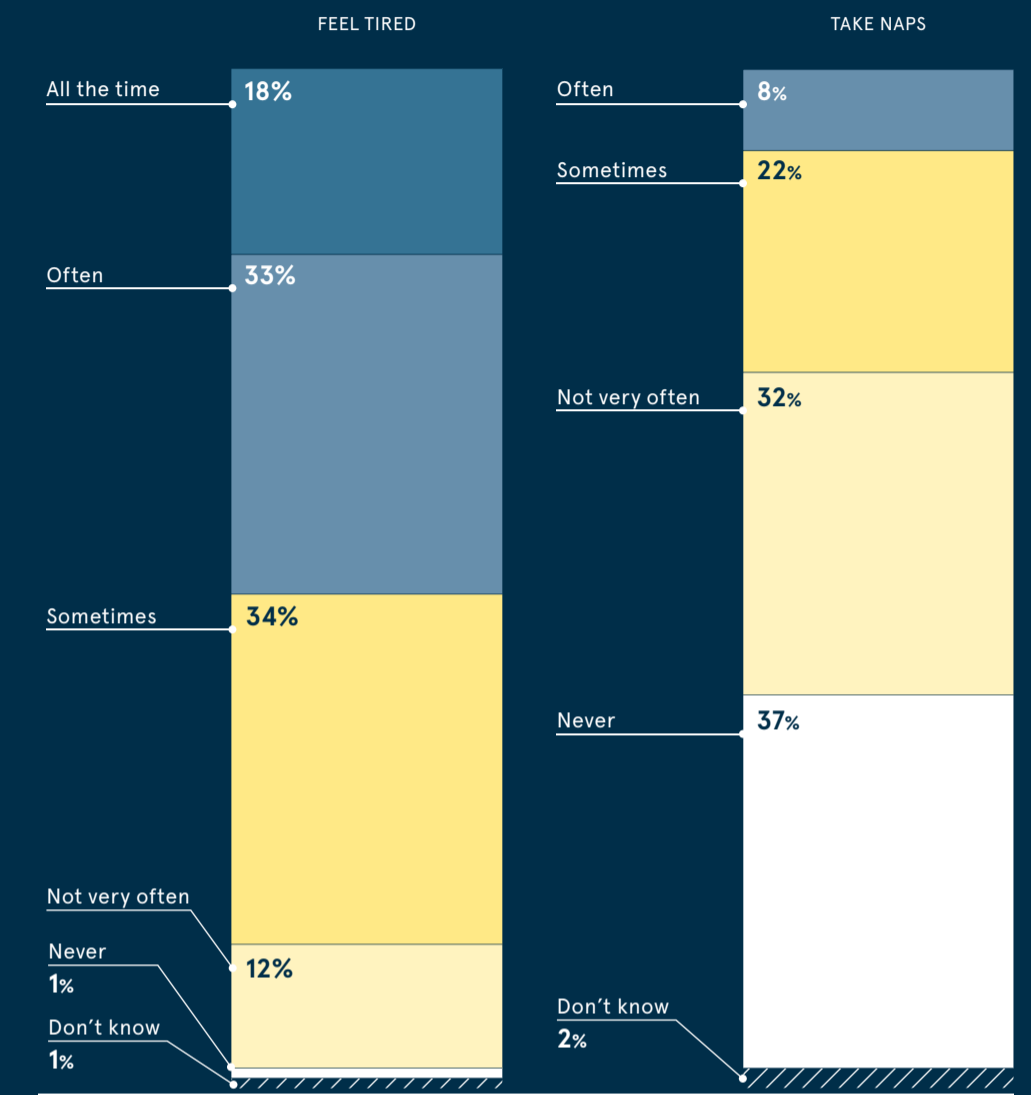
Percentage of people in relationships who complain about the following bedtime behaviour by their partners



UK ADULTS SPEND A LOT OF THEIR TIME FEELING TIRED AND OFTEN RESORT TO TAKING NAPS

Frequency with which UK adults say they feel tired or nap, 11 March 2021. (Percentages may not total 100%, owing to rounding)

YouGov, 2021

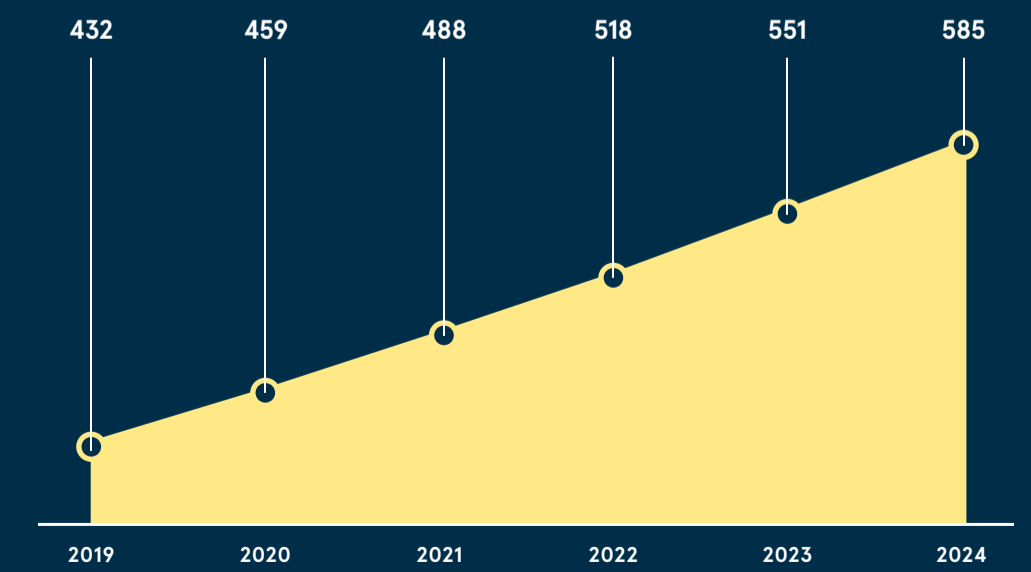


27% of UK adults say that they have fallen asleep at work



THE SLEEP ECONOMY IS SET FOR RAPID GROWTH

Forecast global market value of products, services and applications connected to sleeping (\$bn) Frost & Sullivan, 2019





Photographer, Basak Gurubaz Demman via Gettyimages

THE THERAPY

Changing minds: how CBT can break the sleepless cycle

Although many GPs still seem unaware that it can be used to treat insomnia, cognitive behavioural therapy has been proving to be an effective non-drug intervention. What does it entail?

Julie Penfold

Cognitive behavioural therapy (CBT) is well established as a method of helping people to manage problems by changing how they think and act. It's often used to treat anxiety and depression, but it can also be useful for several other conditions, including bulimia, alcohol dependency and insomnia.

The occasional night of poor sleep is nothing to worry about. But, if it keeps happening, finding an effective way to sleep well again can become an all-consuming task. Desperate to drift off, many of us avidly follow sleep hygiene advice (see "Clean and serene", page 6) and try herbal remedies and medications such as diphenhydramine, a sedating antihistamine designed only for short-term use. But these measures don't always work, of course.

I've experienced long-term insomnia ever since I contracted Covid-19.

Thoroughly exhausted after months of sleeplessness, I approached my GP for help. He promptly offered me an antidepressant that helps people to sleep. CBT was never mentioned.

Perhaps my doctor didn't feel that my condition was chronic (lasting more than three months) at the time. Or maybe he was one of several GPs who, according to behavioural psychologist Alison Gardiner, simply haven't yet realised that CBT is the treatment recommended by the National Institute for Health and Care Excellence.

Gardiner is the founder of Sleepstation, an NHS-approved online service that applies a set of techniques known as cognitive behavioural therapy for insomnia (CBTi). It's used by about half of the GP practices in England.

"We get 47% of our referrals from only 20 regions," Gardiner says.

"When people know about the service, they use it. Some of the resistance to getting people into CBTi is down to the fact that sleep isn't really dealt with as a mental health issue. When someone tells their GP that they're depressed, say, the GP understands what to do and where to refer them. When someone presents with a sleep problem, the GP may not be aware that CBTi is a good approach. Patients are also unlikely to be aware of it."

CBTi is based on the concept that our thoughts, feelings and actions are all connected, and that negative thoughts and feelings can trap people in a vicious circle of behaviour. Dr Jason Ellis, professor of psychology and director of Northumbria University's centre for sleep research, describes how it's being applied to insomnia.

"CBTi is very focused on behavioural concepts," he says. "It aims to identify, challenge and change any dysfunctional beliefs, attitudes or acts that contribute to insomnia. The rationale behind it is that, when you have insomnia, you try to compensate for it. All the effort you make to try to sleep, coupled with the additional time you're spending awake in bed, leaves you feeling worried, frustrated and angry – and that's how we believe that insomnia develops. CBTi aims to address those issues."

One of the first stages of the treatment is to analyse a patient's sleep hygiene to help identify any lifestyle or environmental factors that may be playing a role in their insomnia.

"The interesting thing about this component is that people with insomnia generally have good sleep hygiene," Ellis says. "But we still incorporate it, just in case."

Teaching patients the facts about sleep is another initial component. Known as psychoeducation, this aims to dispel common myths – that

“Some of the resistance to getting people into CBTi is down to the fact that sleep isn't really dealt with as a mental health issue

64%

of Britons whose sleep has been more disturbed since the pandemic started say that they are finding the Covid crisis stressful

54%

of these say that they are very worried about the lifting of the UK's lockdown restrictions

King's College London and Ipsos Mori, 2020

everyone needs eight hours' sleep each night to function properly, for instance – that may be contributing to someone's insomnia.

The CBTi programme will ask you to complete a sleep diary for a week or two. This involves noting down what time you went to bed and what time you tried to sleep, and estimating how long it took you to drop off (checking the clock is not advisable). You also keep track of whether you woke during the night and, if so, how long it took you to get back to sleep. Lastly, you note what times you woke up and got out of bed.

Several free apps offer a sleep diary function. These include Sleepful, a CBTi programme devised by the clinical sleep research team at Loughborough University.

From your diary entries, you will learn how long you were asleep as a proportion of the time you spent in bed, which gives a sleep efficiency score (the normal range is 85% to 90%). This leads to one of the core techniques of CBTi: sleep restriction therapy. This is suitable for most people with insomnia, but inappropriate for some patients, including those with a history of bipolar disorder, seizures and/or obstructive sleep apnoea.

"The name of this therapy is terrible, because it doesn't restrict anyone's sleep," Gardiner says. "What it does do is fix a person's sleep into a set time window. For instance, if you spend 10 hours in bed but sleep for only five hours, there's no point

spending all that time in bed. It works on something called sleep pressure, one of the neurological mechanisms that control sleep."

Over the course of a day, everyone gradually builds up the need to sleep. After about 16 hours, this will usually be strong enough to help us drift off. Sleep restriction aims to keep someone with insomnia up a little longer so that their sleep pressure becomes even stronger.

"When your sleep pressure is at a very high level, it won't just help you to sleep initially; it will also enable you to get back to sleep quickly after brief periods awake," Gardiner says. "What's powerful about this technique is that it works on the physical function of sleep and has a short feedback loop. People do see a difference quite quickly."

As part of the restriction process, your efficiency score is reviewed regularly. Adhering to your sleep window can help to improve your score.

"The first week will be associated with a very brief, mild form of sleep deprivation, as it takes a little while for your brain to reconnect and get back into the sleep default position," Ellis explains. "Once the amount of time that someone can sleep for starts to increase, we give them an extra 15 minutes in bed for the following week. We gradually increase the time in bed in increments of 15 minutes as their sleep efficiency score improves."

A further element of CBTi is known as stimulus control therapy. This is designed to change how a person with insomnia views their bedroom, as it's easy to start assigning feelings of dread to the space when you can't sleep. One idea is to get out of bed if you can't sleep before any frustration kicks in and do something meaningless for 30 minutes before trying again. Another component is the removal of behaviour such as going to bed early to watch TV or read a magazine. This helps to designate the bedroom as a space that's solely for sleep.

The various anxieties that can build up around the consequences of insomnia are also dealt with as part of CBTi. For instance, people may worry that their condition could cost them their job.

"We may have to deal with some catastrophic thinking," Ellis says. "A person's thoughts can become irrational when they can't sleep." ●

Q&A Slipping off to sleep, naturally

Nicola Elliott, founder of natural wellbeing brand NEOM, shares some top tips for a good night's sleep

Q How important is sleep for your overall wellbeing?

A Sleep is crucial; everything starts with it. If there is one thing I've learnt, it's that I really feel it if I've had a bad night's sleep. Hello stress and anxiety, lack of energy and low mood. All the experts agree: sleep is vital for overall health and wellbeing. In short, sleep is the holy grail. If we nail that, we're onto a pretty good start the moment we wake up, which is why at NEOM we're so passionate about helping people sleep better.

Q Can I improve my sense of wellbeing for a better night's sleep?

A I live by the mantra of small steps, big difference. No long unachievable tick lists, or big changes. So, kick off with the basics, such as moving more during the day and getting a dose of fresh air. Have a regular bedtime, a dark room and that all-important tech-free zone an hour before bed. I'm always giving meditation a go too, although it's not easy. Then throw in some of my personal favourites, such as a proper wind down routine, including a bath, mindful breathing and relaxing essential oils. Reading and writing things down before bed can really help clear your mind.

Q Does aromatherapy help bring on slumber?

A The first essential oil blend I created was Perfect Night's Sleep, which I developed for my sister who was having trouble sleeping. It really helped her, so I know firsthand how using essential oils in your pre-bedtime routine can be a game-changer. Not only do the NEOM blends smell amazing – no single drops of lavender here, but seriously complex natural blends of up to 24 oils – they also really work to help lull you to the land of nod. As you inhale essential oils, calming signals go to your brain to help you relax for sleep.

Q Which fragrances aid sleep and how do they work?

A The two NEOM 100% natural sleep blends are Perfect Night's Sleep – the lavender has a soft and super floral scent – and Bedtime Hero, which is sweet, fruity and fresh. Both fragrances have been created to work on your sleep and have been blended within pillow mists, candles and more. Just choose the scent you like the most to add to your bedtime routine.



“Sleep is crucial; everything starts with it. If there is one thing I've learnt, it's that I really feel it if I've had a bad night's sleep

you absorb through the skin. I also like to read in bed every night, then I turn out the light, spritz my pillow with the NEOM Perfect Night's Sleep Pillow Mist and, no matter what sort of day I've had, I am ready to fall into a lovely slumber.

Q What matters most to NEOM?

A At NEOM, we believe wellbeing starts with the little moments. Our fragrances are 100% natural with true wellbeing benefits. So, whether it is through the deeply relaxing bath that prepares you for better sleep, the candle that creates a calm zone and less stress in your busy family home, the shower wash that helps you have more energy ready to kickstart your day at 6am, or the fragrance in your bag with the power to give you a daily mood boost, we truly believe these small additions to your daily wellbeing toolkit make a big difference.

For more information please visit neomorganics.com

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RESEARCH SUGGESTS THAT COGNITIVE BEHAVIOURAL THERAPY FOR INSOMNIA IMPROVES MENTAL HEALTH

The mean change in mental health indicators for individuals who had 22 weeks of CBT in 2015 and 2016

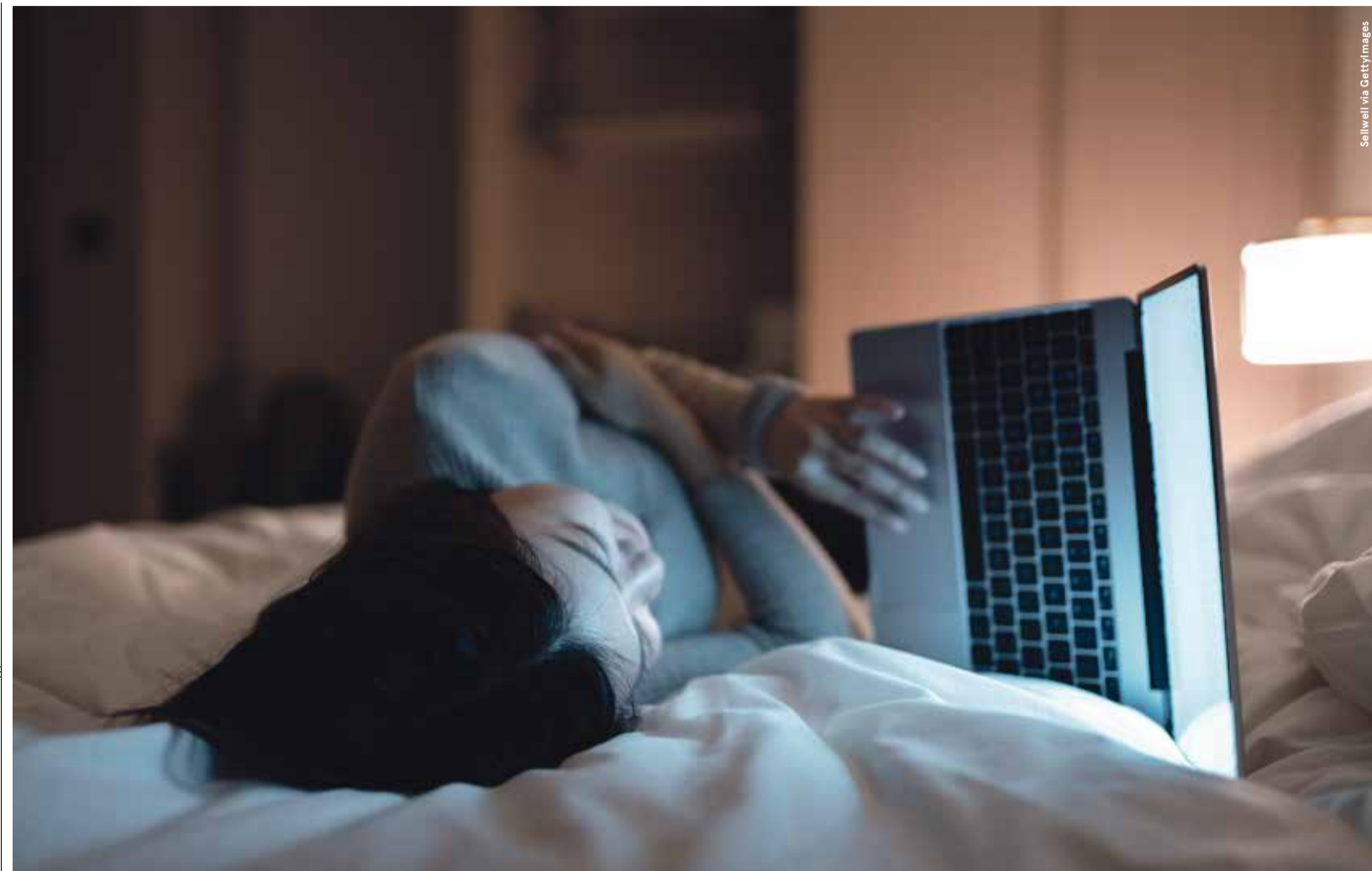
The Lancet, 2017



OCCUPATIONAL HEALTH

From the bed sheet to the balance sheet

As the nation's 'sleep debt' deepens in the pandemic, the increasingly harmful effect that insomnia is having on people's performance at work is moving up the corporate agenda



Virginia Matthews

Official guidance from the World Sleep Society to "reserve the bed for sleep and sex" may sound like common sense, but the rulebook has been rewritten for those who've been obliged to convert their bedrooms into offices during the Covid crisis.

From the comical video calls in pyjamas that characterised the early days of the pandemic to the practice of 'bedmin' – catching up on paperwork in the small hours – the combined bedroom-workplace is an unwelcome reality for millions.

While the enthusiasts once hailed commute-free remote working as the perfect opportunity to relearn good sleep hygiene, it's now clear that the lack of face-to-face contact and the blurring of boundaries between people's professional and domestic lives can be unhealthy, particularly for those who work mostly from their beds.

Talking to employees about how much sleep they're getting is one of the last organisational taboos. For some people, it can be an intensely personal matter that relatively few managers will want to broach. Yet broach it they must. Sleep deprivation already costs the UK economy

“ Business leaders should foster conversations about physical and mental health in a way that encourages openness and debate, particularly now that poor sleep has become so common

upwards of £40bn a year in lost productivity. With hybrid working becoming the rule rather than the exception in many industries, this total is only likely to increase.

People who have chronic insomnia – defined as trouble falling or staying asleep at least three nights a week for three months or longer – are more vulnerable than average to obesity, depression and heart disease. Being alert to the effects of a colleague's sleep problems – lack of focus, irritability, low mood – is one thing if you sit opposite them every day. It's quite another to discern the warning signs when your interactions are restricted to the occasional video call.

"We felt from the start that coronavirus would cause a mental, as well as a physical, pandemic," says Jonathan Hill, head of occupational health at Anglian Water. "It is not surprising that cases of anxiety, burnout and even post-traumatic stress disorder have followed in its wake, all of which have a big bearing on the quantity and quality of the sleep that people are getting."

Anglian Water has 5,000 employees, half of whom work remotely. To break the stigma surrounding insomnia, they are all encouraged to have "good conversations with their line managers" about trigger points at work or at home. They can then be directed towards a range of private healthcare services, including cognitive behavioural therapy sessions and consultations with a 24-hour virtual GP.

In common with other employers, Anglian Water offers free access to a mobile app that offers a range of sleep tools and expert guidance. (The irony of an organisation advocating the use of digital tech in the boudoir – a no-no among sleep scientists – is not lost on Hill.)

At Yorkshire Building Society (YBS) too, the detrimental effects that poor sleep can have are firmly on the HR department's radar.

"We've been marking important awareness events such as World Sleep Day for some years now," says Michelle Elsworth, who leads YBS's wellbeing activities. "But, as the narrative has changed during the Covid crisis, we have redoubled our efforts to combat the anxiety levels that, colleagues say, are making themselves felt as soon as they try to sleep."

While Elsworth believes that asking people direct questions about their sleep patterns "would be seen as intrusive" by some employees, she argues that "business leaders should foster conversations about physical and mental health in a way that encourages openness and debate, particularly now that poor sleep has become so common".

Of all the problems reported by employees in the year to March 2021 via YBS's mental health

platform, 40% related to "feeling constantly tired", Elsworth says.

For front-line staff at the building society, the "emotional impact of having difficult conversations" – particularly with newly unemployed customers who'd suddenly found themselves unable to afford their mortgage repayments – was considerable. "Many of our employees found that they couldn't shake off work at the end of their working day. This inevitably had a negative impact on their family time and their sleep," she reports.

To address this, YBS has instituted so-called check-in and check-out sessions between staff and their managers at each end of the working day. These briefings and debriefings have proved "invaluable", according to Elsworth.

At Unilever, a staff survey revealing that "sleep was an area of concern" prompted the creation in early 2021 of an online portal dedicated to the topic, reports Richard Sharp, its vice-president of HR in the UK and Ireland.

"We always want to ensure that we're putting our people first," he says. "This has become even more important over the past year. Struggling to sleep can have such a big impact on someone's life, both inside and outside work."

Providing information, questionnaires and access to free sleep therapy and coaching, the portal is "designed to have a lasting, positive change". It reinforces the company's commitment to ensuring that "no employee is ever more than one chat, one call or one click away from wellbeing support".

Elsworth notes that it's important to treat each case individually. "While many organisations focus on physical, mental and financial wellness, we also include social wellness," she says. "For some people, this may well entail swapping working from home for the office

5h59m

average hours of sleep a night in Japan, the country with the lowest mean figure

7h30m

average hours of sleep a night in New Zealand, the country with the highest mean figure

7h24m

average hours of sleep a night in the UK, making it one of the best countries for sleeping, but still below the recommended eight hours

Sleep Cycle, 2021

at least part of the time, because they may function – and sleep – better working that way," she says. "From an employer's perspective, it's all about reading the signals and acting upon them."

And, with a programme of digital transformation currently in progress at YBS, this is also about future-proofing the organisation.

Today's employees "expect a fully rounded wellbeing package", says Elsworth. "Although we already do a lot for colleagues, we'll continue to ask ourselves if we can do more to support them across all areas of life – including helping them to get a good night's sleep." ●

POOR SLEEP HAS A SIGNIFICANT IMPACT ON PRODUCTIVITY

The association between sleep and productivity of US employees across several industries. Figures compared with those of workers who slept eight hours a night



American Journal of Health Promotion, 2017

Commercial feature



The link between sleep and wellbeing

Getting a good night's sleep is vital to both our physical and mental health but for those who struggle, there are clinically proven sleep aids to help you drift off

Sleep is vital to everything we do, as important to our bodies as nutrition and breathing, fuelling recovery from mental and physical exertion.

Poor sleep compromises both physical and mental health but many people struggle to get enough sleep and endure feelings of fatigue and lethargy, as well as a reduced sense of wellbeing.

The link between disturbed sleep and mental health is becoming more widely understood with anxiety and stress often leading to insomnia and other sleep problems. This can create a vicious cycle with lack of quality sleep causing stress that, in turn, makes sleeping difficult and exacerbates underlying sleep issues.

Various studies over the years suggest that between 10% and 30% of people experience insomnia, while a survey by the Mental Health Foundation found that 48% of adults and 66% of teenagers agree that sleeping badly has a negative effect on their mental health.³

Sleep naturally helps reduce stress and, although it can sometimes be difficult to get the recommended six to nine hours of quality sleep recommended by the NHS every night,⁴ the benefits include improved concentration levels, sharpened judgement and an improved immune system. It also regulates mood and makes you a better problem solver.

Busy schedules and working from home, as well as other elements of modern life contribute to the build-up of stress and potential corrosion of our mental health. But there are a number of ways to help sleep come more easily.

A healthy diet, regular exercise, reducing alcohol intake and avoiding caffeine after 5pm are important lifestyle improvements that can be combined with creating a healthy sleep environment. Switching off devices at least an hour before going to bed and avoiding working too late can reduce

the levels of hormones that keep the body on high alert.

It is also worth taking time to create a 'sleep sanctuary' by decluttering and tidying your bedroom, blocking out all light and as much noise as possible and – as we spend an estimated 25 years of our life in bed – making sure your bed is comfortable and that all bedding is washed regularly.

For those who prefer a product with natural active ingredient, Nytol also has a range of traditional herbal remedies to aid restful sleep.

Addressing sleep problems and the issues that cause them can be difficult but Nytol is committed to helping people get their fair share of sleep. With more than 20 years' experience helping the UK get a better night's sleep, Nytol offers a range of clinically proven sleep aids that can provide all round sleep cycle support, helping you to drift off gently, improve quality of sleep and wake up feeling refreshed.

Over-the-counter sleep aids that contain the antihistamine diphenhydramine, like Nytol, are indicated for the temporary relief of sleep disturbances but, by improving sleep in the short-term, they may help reset your sleep schedule, enabling you to progress towards consistent sleep.⁷

The negative cycle of poor sleep and stress, and its link to mental health, could be broken by making a good night's sleep an essential part of your life and wellbeing.

For more information please visit nytol.co.uk

Practicing mindfulness and meditation before bed help relax the body and alleviate depression and anxiety.⁵ Listening to relaxation CDs and reading

Nytol Herbal Tablets. Nytol Herbal Simply Sleep One-A-Night tablets contain Valerian root extract. Both traditional herbal medicinal products for use in the temporary relief of sleep disturbances. Nytol Herbal Simply Sleep & Calm Elixir contains Valerian root extract. A traditional herbal medicinal product for use in temporary relief of symptoms of mild anxiety and to aid sleep. All exclusively based upon long-standing use as traditional remedies. Nytol One-A-Night Tablets, Nytol Original 25mg Tablets and Nytol Liquid Caramel Flavour oral solution contain diphenhydramine, an aid to the relief of temporary sleep disturbance in adults. Always read the leaflet. UK/2021-0281

1. <https://www.sleepfoundation.org/insomnia/stress-and-insomnia>
 2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC353813/>
 3. <https://www.mentalhealth.org.uk/our-work/research/sleep-and-mental-health-uk>
 4. <https://www.nhs.uk/life-well/sleep-and-tiredness/how-to-get-to-sleep/>
 5. <https://www.healthline.com/health/sleep/best-temperature-to-sleep>
 6. https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/18097547_hstc=3584879.822a9c5981f0469564b9dc054b5f524.1523145601970.1523145601971.1523145601972.18_hssc=3584879.1.15231456019738_hstcp=1773664937
 7. <https://www.sleepfoundation.org/insomnia/treatment/safe-use-sleep-aids>

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- 2 GOOD QUALITY SLEEP
- 3 WAKE UP REFRESHED

Nytol Liquid Caramel Flavour 10mg/5ml oral solution and Nytol One-A-Night Tablets contain diphenhydramine. Aids to the relief of temporary sleep disturbance in adults. UK/2021-0269

DIGESTIVE HEALTH

Did somebody say 'just sleep'?

Studies suggest a possible link between insomnia and a lack of diversity in gut bacteria. The scientists say there is plenty in this for them to chew on

Katrina Megget

Bad night's sleep? It's not uncommon to crave the compensatory comfort of a full-fat, sugar-encrusted doughnut. Equally, a large dinner of fried food might leave you tossing and turning in bed and waking drained the next day. But food isn't necessarily the common denominator here. Increasingly, evidence suggests that the gut microbiome – the bacteria and other micro-organisms in our digestive tract – can influence the quality of our sleep.

Research into the microbiome and its role in health and behaviour has been a hot topic for several years, with research suggesting links between gut bacteria and various diseases and mental health disorders, including cancer and depression. Now scientists believe that there seems to be a relationship with sleep too.

Dr David Gozal, professor of child health, medical physiology and pharmacology at the University of Missouri School of Medicine, is one of those scientists.

"Sleep is very likely have an influence on the gut microbiome," he says. "Conversely, it is very likely that changes in the microbiome have an influence on sleep."

Gozal has put this theory to the test in mice. His team transplanted faecal material from mice that had been genetically engineered to have the chronic condition obstructive sleep apnoea (OSA) into a group of normal mice. The study, published in the journal *Experimental Neurology*, found that the normal mice developed the OSA symptom of increased sleepiness. According to Gozal, the transplant altered the gut microbiome of the normal mice and affected their sleep.

Meanwhile, several studies have shown that people who sleep better have a more diverse and healthy gut microbiome – and they tend to be in better health generally. This is a big deal when the US Centers for Disease Control and Prevention

deem insufficient sleep to be a public health problem.

"Disrupted sleep may be as bad as an unhealthy diet for the health of the gut microbiome," says Dr Emeran Mayer, research professor of medicine at the University of California, Los Angeles, and author of *The Gut-Immune Connection*.

The interaction between the digestive system and sleep comes down to what's known as the brain-gut microbiome axis, which enables a bidirectional flow of information between the two systems. This is likely to be influenced by both the microbiome's own circadian rhythm and the regulation of sleep genes, according to Mayer.

It's also believed that gut bacteria produce basic molecules from food



called metabolites, which are shuttled to, or communicate with, the brain through the axis. Although the research is still in its infancy, there are numerous theories as to how this might happen. One is that the gut microbiome could affect the immune system and vary the level of immune-signalling molecules such as cytokines. Another is that it could regulate chemical messenger molecules called neurotransmitters, including the stress hormone cortisol.

A recent study in Japan, published in *Scientific Reports*, highlights the role that metabolites might play. Researchers compared

the intestinal contents of normal mice with those that had a depleted gut microbiome. All of the mice were fed the same diet, but the researchers found that the metabolites were different in the two groups. Significantly, the mice with depleted microbiomes didn't appear to possess the bacteria that convert the amino-acid tryptophan in food into the sleep hormone serotonin. These mice had disrupted sleep patterns.

This all leads to a tantalising proposition: if we were to alter our diet or the microbiome of our gut, could we improve our sleep?

The idea certainly holds some promise. Take probiotics – fibre compounds in food that feed the beneficial gut bacteria. Another study published in *Scientific Reports* found that rats on a prebiotic diet not only slept more soundly than those on a non-prebiotic diet; they were also better at dealing with stress.

When they dug deeper, the researchers found that the rats on the prebiotic diet had fewer sleep-disrupting metabolites. They are cautiously optimistic that their findings could spawn new methods for treating sleep problems. One of the authors of the research is Dr Monika Fleshner, professor of integrative physiology at the University of Colorado. She says that the discovery of "an innovative alternative to sleep medications is desirable. The next step is to figure out which dietary prebiotics can affect which types of gut bacteria."

Dr Jaime Tartar, director of the neuroscience programme at Nova Southeastern University in Florida, warns that the relationship between

“People need to treat sleep not as an expendable commodity but rather as a major long-term determinant of health and wellness

the gut microbiome and sleep is complex. "I don't think the answer for significantly better sleep will be simply to supplement the diet with a particular prebiotic," she says. "But this research area holds the promise of directing us towards how we can improve sleep through diet." Manipulating the gut microbiome could target a number of health problems associated with poor sleep, such as cardiovascular disease and diabetes. Gozal believes that a greater understanding of the gut microbiome in health heralds a new approach to sleep.

"This opens unique opportunities for 'sleepbiotics' and the development of approaches to promote healthy sleep, as well as the treatment of sleep disorders using personalised interventions," he says.

Indeed, Unilever has recently joined forces with Microba Life Sciences to explore this very area. "People need to treat sleep not as an expendable commodity but rather as a major long-term determinant of health and wellness," Gozal adds. The gut microbiome has a role to play in this, but we are only just starting to discover its nature and extent. ●

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