

Loosen Up, Sleep Tight

*How Relaxation Techniques
May Be the Solution to
Stress-Induced Insomnia*

by Afomia Ayele

It was 4 AM, and Sassy Smith had had enough of her sleepless nights. Every night, she lay awake, envious of her husband as he enjoyed his peaceful slumber right beside her. Of course, this wasn't Sassy's first time being awake so early in the morning and unfortunately, it was not going to be her last. Sassy had spent the past six months racking her brain over why she was sleeping fewer and fewer hours each day, now averaging about three hours a night. She tried exercising, took a break from drinking coffee, and even drank a couple of glasses of wine before bed. Despite her optimism, none of these improved her sleeping. Her head was constantly filled with racing thoughts of the waking day, which always hit her like a train the moment she went to bed. Many of these thoughts were negative and anxiety-ridden, with fears of being inadequate or struggling to keep her home life organized and peaceful. Conversations would play on loop as if her mind could not string the events together. To quiet some of these thoughts, Sassy tried taking sleeping pills; not only did the insomnia persist but she started feeling groggy and uncomfortable with the pills' side effects. Regardless, she continued to push forward with her busy life and watched the hours ticking by every time her head hit the pillow.

It wasn't until almost a year later that Sassy figured out what was triggering her sleep problems. The stress she experienced was so intense that her body was pumping extremely high levels of cortisol, a hormone that triggers our fight-or-flight response, both day and night. Not only did this disrupt her sleep, but it also affected her hormonal levels and mental health. It wasn't until she started making adjustments in her schedule to reduce her stress that she could get her nightly eight hours of sleep again.¹

Insomnia is More Common Than You May Think!

Unfortunately, Sassy's story is one of many describing the challenges of living with insomnia, a sleep disorder characterized by difficulty with falling or staying asleep.² Many insomniacs describe their experiences in the following way: "It would take me forever to go to sleep, and, then I would wake up and couldn't go back to sleep. I had problems going to sleep, and then I had problems staying awake."³

Insomnia can be a slightly different experience for each person who has it; therefore, its diagnosis includes a wide range of symptoms. As a result, it is unsurprising that insomnia actually affects up to half of the general population, meaning you probably know somebody who has had insomnia or you may have had it yourself. Insomnia can be caused by many factors, such as psychiatric conditions, genetic predisposition, inconsistent sleep schedules, or even medications.⁴

Due to the broad nature of insomnia symptoms and potential causes, some individuals may not even know what is causing their insomnia. However, one of the most common root causes is stress, which can lead to physical, mental, and emotional strain. Stressors come from the environment and evoke a physiological response; some examples of stressors include school, work, an illness, a living situation, or even a relationship. For most adults, occupational stress dominates over all other forms. This form of stress typically manifests as worrying about staying on top of one's schedule while also planning future tasks, meetings, and reassignments, which can be a lot to take on. Occupational stress is also exacerbated by long shifts, especially those ranging from eight to sixteen hours a day. Working long hours in a stressful environment, like what we see with Sassy's life, may trigger a higher release of cortisol in the body, which triggers a response in the brain that interrupts the system for sleep.⁵ The association between stress and impaired sleep is sometimes referred to as



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stress-induced insomnia, which is very common in adults who work long and/or intensive jobs such as surgeons, pilots, engineers, or even truck drivers.

Not only is the lack of shut-eye uncomfortable, but it can also disrupt many other bodily functions that are essential for performing daily tasks and maintaining good health overall. In fact, the chronic sleep loss from insomnia can even compromise one's lifespan. Short term effects include memory loss, slower memory recall, impaired cognitive function, worsened coordination, slower responses, and overall weaker performance in daily tasks.⁶ When these symptoms make it harder to complete work for a job, you're caught in a vicious spiral with no end in sight, unless you seek proper treatment. As stress increases, so do the consequences. In situations where an emergency arises and all parties are affected, these consequences multiply and can soon spiral into chaos.

Treating Patients While Becoming More Ill: a Recipe for Disaster

One critical example of an intense stressor is the COVID-19 pandemic, during which millions of doctors, nurses, and other medical staff were overworked to treat the multiplying cases of coronavirus infection around the world. In fact, a recent study determined that 63% of the working doctors in surgical specialties, and over 80% of general surgeons, were showing symptoms of insomnia. Insomnia was also 13.1% higher in female doctors than male doctors, and doctors in the 30 to 40 age range endured more sleepless nights than those in any higher range. The latter statistic may be due to the general ability of more experienced physicians in this age demographic to take on new responsibilities with more ease. The COVID-19 pandemic shows a rise in cases of insomnia manifesting

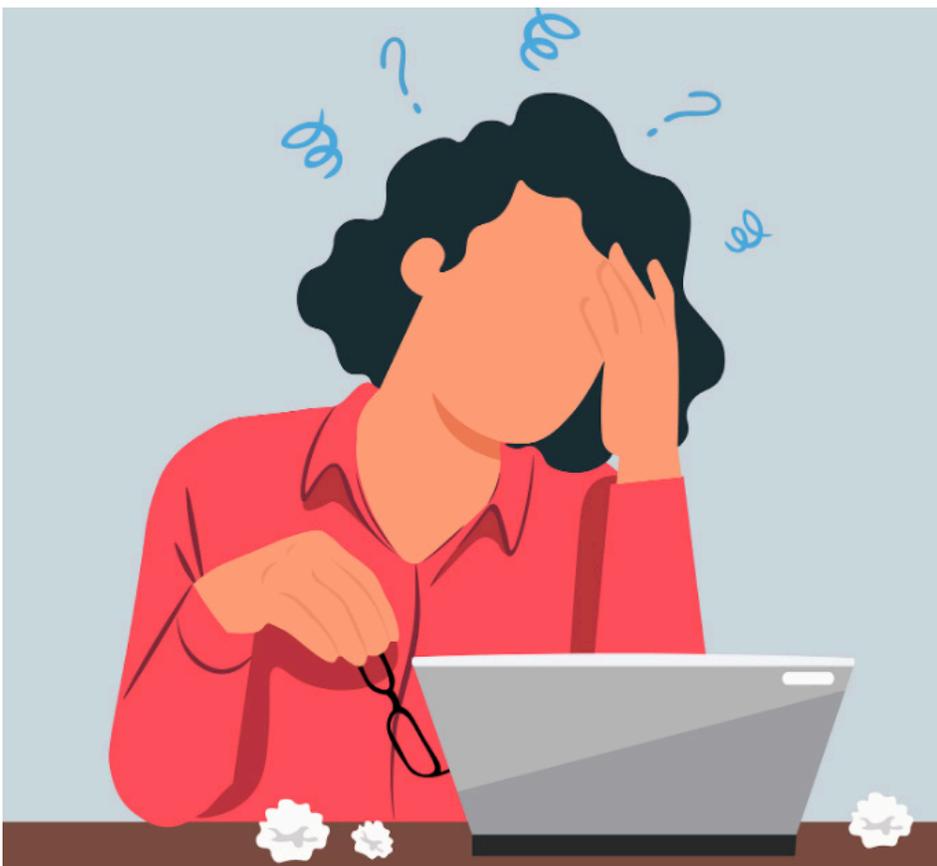
from occupational stress for doctors, especially residents and new attending physicians.⁷

Although COVID-19 highlights some prime examples of insomnia caused by stress, we see that these health consequences in overworked doctors have been around for a very long time, even well before the pandemic. A UK study from 2019 looked at general occupational distress in doctors as a root cause for serious issues like binge-eating, alcoholism, and insomnia. Using a survey sample of doctors, they found that up to 61% of doctors reported some sort of sleep problem, and 12% had moderate to severe insomnia.⁸

While the data on doctors is pretty alarming, these issues are even more prevalent in other healthcare workers, especially nurses and medical assistants. A recent study investigated the effects of night-shift work on nurses, who experienced severely compromised psychomotor function after working day-to-day changes in their 8-hour shift rotations. Psychomotor function refers to the cognitive processing responsible for body movement, so a compromise in this function can be very detrimental to the nurse experiencing it. Although these findings apply strictly to night-shift workers, they build on previous evidence seen in general nurse practitioners and similar health care personnel.⁹ Some studies have even tried to replicate these findings in a mouse model; however, not many have linked insomnia to stress.^{9,10}

A Sky-High Job, Just Like Your Stress Levels

If we branch out to other occupations outside of medicine, we see that occupational stress is a relatively universal problem. Some



studies have looked at people working in aviation, most of whom not only work many hours, but also have a constantly adjusting sleep schedule. Not only does this make aviation a more challenging career path, but it can also lead to complications with using the technology and equipment. In fact, 70% of the accidents in aviation were caused by suboptimal “user performance,” indicating that these issues were on the pilot’s end rather than the plane’s end.¹¹ Although accidents are relatively rare, this indicates immense pressure for pilots not just to be present for the job but to make sure nothing goes wrong. Since these accidents can be fatal, these statistics could have some serious implications on what needs to be prioritized in the conditions of an occupation. With aviation, these priorities would need to be prepared not just for pilots but any workplace at which someone’s health and safety could be in jeopardy.

Understanding the Pathway: How Does it All Go Down?

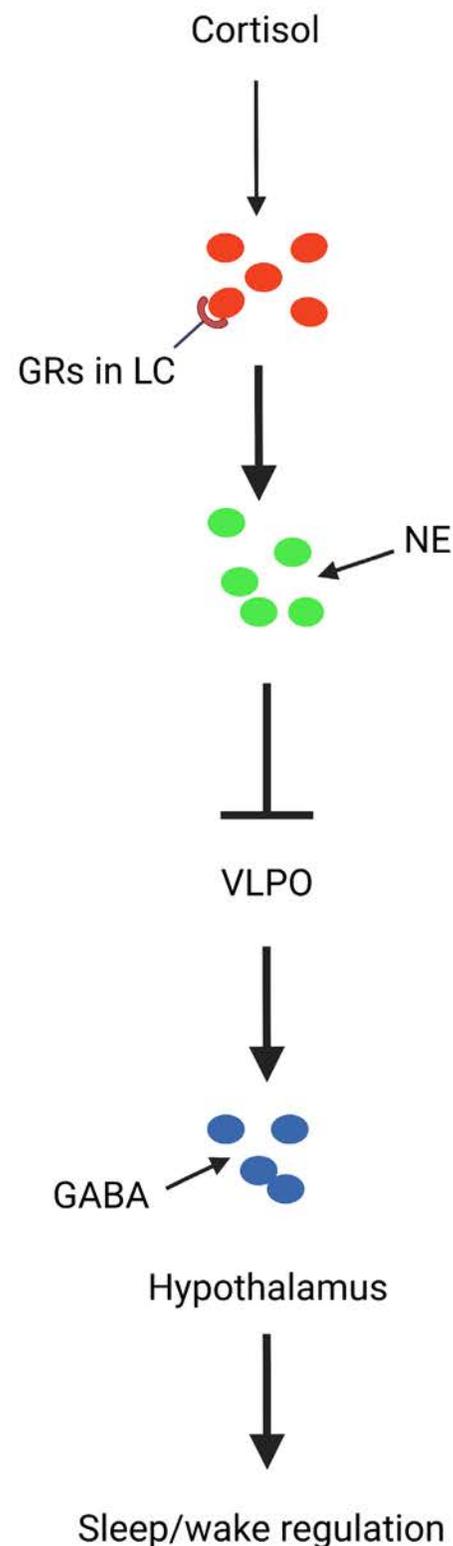
There are various regions in the central nervous system, especially the brain, that play an important role in managing your sleep and wake states. One of these regions is the hypothalamus, which has neurons (nerve cells) that produce and release histamine to maintain the sleep-wake cycle, along with maintaining homeostasis, the body’s system for keeping stable processes and features, such as a temperature of 98.6°. The hypothalamus can also receive input from other regions, such as the ventrolateral preoptic nucleus (VLPO) a brain region that regulates non-REM (rapid eye movement) sleep. The VLPO has GABAergic neurons that release

GABA, a common neurotransmitter that reduces neuronal activity, onto the hypothalamus to encourage sleep onset.⁵ However, this system, like many others, can receive interference by which the sleep-wake cycles of the brain can easily fall apart.

Interference can come in many forms, one of which starts with cortisol. Cortisol, the stress hormone, is released into the bloodstream to evoke a fight-or-flight response. This process is quite normal for people and doesn’t just happen in cases of stress-induced insomnia, as we’ve seen with Sassy’s story. The body releases an abundance of cortisol in the morning, but levels can fluctuate during the day. Moreover, they can be extremely low or extremely high, especially when one spends most of their waking hours in a stressful place or situation, or if they are managing stressful relationships. Within hours, this cortisol release makes its way to the brain, binding to its designated receptor, the glucocorticoid receptor (GR). While GR’s are found in nearly every cell of the human body, there is a high density of these receptors in the brain, specifically the locus coeruleus (LC). The LC produces norepinephrine (also called noradrenaline) that hits the VLPO and disrupts the signal for sleep.⁵ As a result, sleep-wake cycles become disorganized and less distinguishable, and before you know it you have a textbook case of insomnia on your hands.

Stress Can Affect More Than Just Your Sleep Patterns

Of course, high cortisol levels can lead to a myriad of sleep disorders besides insomnia. These disorders then go on to cause issues with decision making (a job



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for the prefrontal cortex), memory (controlled by the hippocampus), and even motor skills (primary motor and premotor cortex).¹² Soon, the lack of sleep will lead to missing deadlines, not responding to your name being called, and shaky hands; the same stress response that should tell you to “think fast” has slowed you down more than ever. These symptoms vary from person to person, but they always worsen with time. For instance, we’ve seen how many nurses have to work without stable sleep patterns, but nurses also have a long list of motor deficits from their sleep loss, especially when rooted in occupational stress. Researchers have seen higher risks in quality of care and safety among services provided by the health-care sector, and the night shifts increase sleepiness and reduce psychomotor performance in all forms of hospital personnel.¹³ Furthermore, disrupted sleep from night shifts amongst nurses also affect different areas of attentional processing, like selective attention; when this makes it difficult to multitask and sort through the information they work with daily, it can have serious implications on the services they provide to their patients, and both patients and nurses are now at jeopardy.

With a Caffeine Fix, Can We Fix the Problem?

Since most people with insomnia can’t cure their symptoms,

they cope by consuming caffeine, a stimulant that prevents sleepiness. Caffeine is the most common drug consumed in the world and is usually present in coffee, tea, soft drinks, or other beverages. One study saw that the 24 to 29 age group was one of the highest consumers of caffeine, with almost 10% of survey respondents stating that they consumed 4 cups of coffee every day! The next most caffeine-consuming group was between the ages of 18 and 23, but the majority of these individuals only had one cup a day. Caffeine is easily accessible and can be taken in through lots of delicious mochas, lattes, or even a fruity energy shot, but being dependent on caffeine can lead to some frustrating side effects, such as withdrawal, headaches, digestive issues, and other problems. Some people even get anxiety attacks after consuming too much caffeine, which would only make the issue of stress and sleep loss worse. Since these side effects can be frustrating and still don’t bring stress levels down or promote healthy sleep, many people look for other solutions that cut out the middleman and truly resolve the issue at hand.¹⁴

Is it Chill to Take a Chill Pill?

Sleeping pills are usually the next place to go. Overall, reviews have been mixed on whether or not to treat insomnia patients with sleeping pills. Not only can the wrong dose be harmful or even fatal

for a patient, but benzodiazepines, drugs that act on the GABA receptor in the brain to induce sleep, can worsen cognition and psychomotor performance, which brings us back to the same issue we see in insomniacs who lose sleep.¹⁰ Additionally, benzodiazepines also do not help with maladjustment to shift work or changing sleep schedules (such as jet-lag), meaning that the effectiveness of these pills is pretty limited. To add on, drug dependence is a problem for anyone who takes pills daily, which we’ve already seen with avid coffee drinkers. There needs to be a way to fix the issue without minimally effective or ineffective drug use while still restoring health to the body and mind.

Relax! But is it That Easy?

If high stress levels are to blame for insomnia and most of its symptoms, is there a way to lower stress response without using drugs? As it turns out, there is. A common treatment for psychiatric and sleep disorders is cognitive-behavioral therapy, which comes in many flavors. Cognitive-behavioral therapy, or CBT, involves therapeutic strategies to improve the mental health and cognition of a patient struggling with a specific illness or disorder. Some have called it the “golden standard,” as studies have shown that CBT is the most effective form of psychotherapy as well as the most studied. CBT types range from cognitive therapy, which aims to remodel distorted thinking patterns, to exposure therapy, which is used to minimize panic response in patients with a phobia or panic disorder.¹⁵ Although various forms of this therapy exist, there are still novel techniques that are being optimized to address some of the more stubborn symptoms of certain conditions, especially those

patients who receive treatment for psychotherapy may have positive experiences with it and even see some result, but they internalize the public stigma that is present in their communities, distorting their self-esteem and self-efficacy; this phenomenon is known as self-stigma and can not only drive people away from psychotherapy but also damage their-self image, which could have long-term consequences.²⁰

Fortunately, many institutions have been devising methods with which the general public can have an awareness of psychiatric resources for themselves or people they know. These awareness tactics have promoted the use of CBT and can hopefully further normalize relaxation therapy over time. Additionally, recent psychological researchers have found ways to reduce the self-stigma affiliated with psychotherapy using self-affirmation intervention, which involves participants reflecting on an important personal characteristic. Researchers hypothesize that this technique can encourage patients to continue with psychotherapy as well as improve their response to it.²¹ Self-affirmation could especially strengthen the utility of relaxation therapy and other CBT despite social stigma, and could even change the attitude towards therapy over time.

Next Steps: Normalizing Relaxation Therapies for Stress-Induced Insomnia

Insomnia caused by stress is an extremely devastating condition that can have serious and widespread consequences. While there are treatments in place, the acceptance for therapies

to treat the condition as a whole and reach the individualized needs of patients with it is still underway, with many researchers investigating a true cure, despite how dynamic this condition can be. Relaxation therapy is a dynamic, individualized approach which can reduce stress and improve sleep, the question remains unanswered of how effective it is in targeting all symptoms. Some studies have used a mouse model for insomnia to look at motor deficits, but few have yet to pair insomnia to any stress-related cause.¹⁰ Investigating these interactions can help us to create treatments not just to reduce stress or help with sleep, but also restore the fine motor skills, balance, coordination, and other motor functions that are essential for occupational work. These applications could help pilots to prevent accidents caused by human error, help surgeons to make fewer medical mistakes during their procedures, and help nearly anyone in an office job who spends much of their time typing

up documents on the computer. Furthermore, investigating ways for professionals with high-stake jobs to reduce stress is still a conversation that can be dismissed quite abruptly. In fact, Sassy Smith now works as a personal coach to start the conversation addressing issues related to work-life balance and stress, and many other people are now joining her. Those involved in addressing such issues and promoting stress-relieving techniques can create an impetus for more research on the methods themselves and how they're implemented. With time, future research can hopefully show how essential stress management is not only in preventing anxiety but also getting a full sleep cycle every night, which will improve productivity and also the lifespan of the worker, which ends up being a win-win for themselves and their employers. In good time, we can hopefully find an effective solution to stress-induced insomnia and build on our understanding of the need for a full eight hours of sleep. ■



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