

'You are not alone': Q&A with expert on sleep, stress and memory in women

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Women often talk about the struggles they face feeling pinched between family and work obligations. As a result, many have trouble getting enough quality sleep, managing stress and maintaining a healthy work-life balance. These issues are very near and dear to the heart of Notre Dame's Jessica Payne, professor of psychology and director of the Sleep, Stress and Memory (SAM) Lab, whose research focuses on how sleep

and stress influence psychological function, well-being and human memory.

During Women's History Month, we decided to ask Payne how these issues affect [women](#) in particular.

What are some issues women have when it comes to sleep?

There's no way to answer this question without talking about the huge influence of hormones on women and how they affect our bodies. Women experience extreme fluctuations in their hormonal levels at four distinct points in their life—during puberty, pregnancy, menopause and even within their monthly cycle. These [hormonal changes](#) interact with neurotransmitters in the brain, which can cause women to wake up in the middle of the night, unable to go back to sleep. And, for those experiencing menopause, this can also mean waking up drenched in sweat caused by hot flashes.

When women enter into the phase of perimenopause, which is the time leading up to full menopause (a ceasing of the menstrual cycle), their estrogen and progesterone levels change and their release becomes erratic. This can make you feel like you are on an emotional rollercoaster. For example, because progesterone acts as an anti-anxiety hormone, calming you down and promoting sleep, its drastic drop can wreak havoc on women when it comes to sleep and stress management.

Not only do you have these hormonal influences on your ability to calm down and go to sleep, but they are also interfering with the process of sleep. You get the majority of your deep, or slow-wave, sleep in the beginning of the night, during the first three or four hours. This is a really important stage of restful sleeping when the brain is locked in and

it is actually very hard to wake people up out of [slow-wave sleep](#) (this stage is thought to be crucial for memory consolidation—but more on this later). The second half of the night is when you get the majority of your rapid eye movement (REM) sleep—a stage when a person's brain activity, breathing, blood pressure and heart rate increase, and the eyes move rapidly while closed (this phase is typically when most dreams occur).

When you make that transition from the first part of the night to the second part, full awakening can occur if the brain alerts enough as it moves into the REM state where it is naturally more active. If you introduce stress or hormonal changes—or an attack of those night sweats—during this time when you're already riding the cusp of wakefulness, then it's more likely you'll wake all the way up and not be able to go back to sleep. It's really tough to get back into a state of uninterrupted sleep when you've introduced all of these other arousing variables—especially since key parts of your brain (including the emotional centers of the brain) are most active during the latter part of the night.

Why is quality, uninterrupted sleep so crucial?

People often think sleep is just a time of rest and rejuvenation, but nothing could be further from the truth. Your sleeping brain is highly and intensively active, and that's especially the case in this REM sleep later in the night. One of the purposes of REM sleep is to process and regulate emotions. If you wake up before you head into REM sleep, and there's a little bit too much stress or too much cortisol (a primary stress hormone) in your system, then you might find yourself awake, anxious and ruminating the rest of the night. And sleep deprivation itself is a stressor. When you're sleep deprived, you produce more cortisol, which then makes it harder to sleep—it becomes a vicious cycle.

Sleep is also crucial for [memory consolidation](#)—it is one of your most important tools for shoring up your cognitive processes and memory. Memory consolidation is the ability to take in new information and commit it to long-term memory. If you're not sleeping well, then it's harder to learn or acquire new information and put it into storage for later use, and then even harder to retrieve it when you need it. Protecting your sleep is a really good way to buffer against some of the memory decline that comes naturally with aging.

What role does stress play in women's lives, especially in our modern times?

We can break this down into simple form by talking about the [autonomic nervous system](#), which is broken down into two halves: the sympathetic and the [parasympathetic nervous systems](#). The [sympathetic nervous system](#) is your fight or flight response; it makes your heart beat faster and releases stress-related hormones and neuromodulators that are supposed to help you survive a threat. The parasympathetic side does the opposite—it drops those levels of stress hormones, calms your heart and reduces blood pressure.

Many of us have gotten kind of stuck in this sympathetic state of high stress and reaction, whether it be from the everyday stressors of family and work, or from our COVID traumas or everything awful and worrisome that's in the news these days. We need to find a way to counteract that sympathetic response that is in overdrive and create more balance between the two systems. We need to train or tone the parasympathetic side, almost as if it were a muscle that we are leveraging for a relaxation response. We are actually able to change our physiology this way, potentially even the very structure of the brain, in a way that allows us to heal our nervous systems a little bit, reduce stress and regulate negative emotions better in future scenarios. These skills

are really relevant to women—not just in the moment, but in all future moments.

What do you recommend to women for making positive change in their lives?

First of all, do your research and find a good physician who has the right information to discuss your options, especially when it comes to things like hormone replacement therapy. See if it's right for you. Back in the early 1990s, there was a study that came out that really scared women away from hormone replacement therapy, saying it could cause certain cancers. The study turned out to be flawed and the risks appear to be small for many people. Unless you're at high risk for breast cancer, for example, that solution might be worth it for you.

Second, we need to bring stress down by lowering those stress-related hormone levels, particularly because you can't sleep if those are too elevated. One way to do this is by bringing meditation or relaxation exercises into our daily routines. I suggest engaging in just five or 10 minutes of an activity every day where you are focusing on your breathing. You activate your parasympathetic nervous system when your breath out is longer than your breath in, and that can drop stress levels and slow your heart rate. There are even apps these days that you can use for this activity that can help calm you. You can take that a step further and add an attentional component to the breathing—such as a mantra or prayer—that you focus on while breathing, keeping you in the moment.

Most people disregard this activity because they've either tried it but they haven't stuck with it long enough to see the benefits, or they think it seems unreasonable that closing your eyes, breathing deeply and continually returning to the moment could actually change your physiology. But it does. It can. Just like you can lose [neural tissue](#) when

you're chronically under a lot of stress, you can build neural tissue back up again by engaging in an activity like meditation. This neural growth occurs in brain networks that are responsible for emotion and stress regulation, which means the brain may become physically more capable of regulating negative emotions and stress. Commit to these exercises several times a day for five weeks and see what happens.

The other suggestion is to target the sleep directly by trying to build in more sleep time. Even adding an extra 20 minutes of good sleep each night can be beneficial. When you get better sleep you feel better, and that helps improve your mood and helps you manage stress. We have to fight back physically against the ravages of stress that affect women so much.

Where do we go from here?

The first—and most important—thing I want to convey is that you are not alone. We all think that we must be the only ones struggling, but we're not. These issues are not obscure—they are real and not just your imagination. Many, if not most, women are experiencing these same problems in some form and to some degree, at least once in those four stages of life and perhaps especially during perimenopause.

The second message is that we are not talking about these struggles enough. Women are sort of suffering in silence because we feel society expects us to "keep it together," and that can be really hard and can take a huge toll on our energy. This suffering can lead to sadness, even more anxiety, trouble in relationships and at work, health issues, etc.

My third observation is that more work needs to be done in terms of further study and research into the effects of hormones and hormone replacement therapy on sleep, and the relationship between sleep and memory. The science behind the connections of all these elements we've

talked about is nascent, and so lacking. We don't really know how perimenopause impacts the sleep and stress systems—it's just so understudied.

There also needs to be more attention given to women's mental health as far as research goes. What we don't quite understand yet is whether women are more likely to get diagnosed with conditions because they are more inclined to visit a doctor to ask questions, or are they more predisposed or susceptible to mental [health issues](#) in part because of hormonal changes and the accompanying [stress](#) and lack of sleep. These issues affect women differently and at different times in their lives.

I hope someone out there is able to take this to heart, especially if they see that other women are talking about the same thing. And know that you are never alone.

Provided by University of Notre Dame

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