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Democracy Dies in Darkness

How stress can damage your brain and body

By Stacey Colino
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intro

We all know what stress feels like physically — though the symptoms vary by person. Some people experience shakiness or a racing heart, while others develop muscle tension, headaches or stomach aches. But what we might not realize is that our physiological responses to life's stresses and strains can have deeper, less obvious repercussions for just about every organ and system in the body.

Symptons of being under stress I personally have felt these a few times.

body

"I think people really underestimate just how big the effects are," said Janice Kiecolt-Glaser, director of the Institute for Behavioral Medicine Research at Ohio State University's College of Medicine. When you experience stress, your brain triggers the release of a cascade of hormones — such as cortisol, epinephrine (a.k.a., adrenaline) and norepinephrine — that produce physiological changes. These changes, called the stress response or the fight-or-flight response, are designed to help people react to or cope with a threat or danger they're facing.

Body

The trouble is that these changes can and do occur in response to stressors that are not life-threatening — work deadlines, traffic jams, financial pressures, family strife — and, over time, they can take a toll on the body and mind. "People understand big stressors, but they don't pay attention to smaller, accumulating stressors that make a difference, too," Kiecolt-Glaser said.

The whole-body impact of stress

What follows is a detailed look at how stress can affect many organs and systems in the body, from head to toe.

body

The brain: Acute forms of stress — when you're facing a work deadline or having an argument with a loved one, for example — can be beneficial in the short term, briefly bathing the brain with hormones (such as cortisol) that help improve your motivation, ability to focus and performance, said Wendy Suzuki, a professor of neural science and psychology at New York University and author of "Good Anxiety: Harnessing the Power of the Most Misunderstood Emotion."

There are short and long terms forms of stress.

Being stressed out can affect our memory, and
we entard/focus with others.

By contrast, the prolonged elevated cortisol levels that come with chronic stress and post-traumatic stress disorder (PTSD) can interfere with and damage the brain's hippocampus, which is critical for long-term memory function, Suzuki said. Long-term increases in cortisol also can damage the brain's prefrontal cortex, which is essential for focused attention and executive function (cognitive processes that allow you to plan, organize, solve problems, engage in flexible thinking and control your impulses).

Intro

The cardiovascular system: With acute stress, your heart rate increases and your blood pressure surges, so (evolutionarily speaking) you can prepare to fight or run for your life. After the stressful encounter subsides, these functions are supposed return to their normal states. But that doesn't always happen in the modern world, where we can encounter stressor after stressor.

Body

Chronic stress, which occurs over months to years, can lead to high blood pressure, adiposity (fat accumulation), insulin resistance and greater systemic inflammation, said Ahmed Tawakol, co-director of the Cardiovascular Imaging Research Center and director of nuclear cardiology at the Massachusetts General Hospital and Harvard Medical School. "Together, these drive the buildup of arterial plaques and heighten the risk of heart attack and stroke."

Over time, stress also can lead to the narrowing of blood vessels and heightened coagulation (blood clotting), which further raise the risk of cardiac events. It's also possible that if someone experiences an acute stressor on top of chronic stress, "there could be an additive effect such that the acute stress could trigger a heart attack or stroke," Tawakol said.

Risks and problems of having chronic stress. I have felt before my heart rate increase before.

The respiratory system: During a stressful situation, the sympathetic nervous system ramps up and stress hormones are released, which leads to rapid respiration and can make you feel as though you can't catch your breath. This can affect the transport of oxygen and carbon dioxide in your blood. "Shallow, rapid breathing is not a good thing. You're not getting rid of carbon dioxide optimally, and you can starve yourself of oxygen, which can lead to symptoms such as lightheadedness and dizziness," said Neil Schachter, a pulmonary specialist and professor of medicine at the Mount Sinai Medical Center in New York City.

Having stress can increase the risk of asthma attacks

Both acute and chronic stress can trigger asthma attacks or exacerbate chronic obstructive pulmonary disease (COPD) in those who have these conditions. A review of studies in a 2017 issue of the journal Respiratory Medicine found that active stressors (such as having to complete a math task) and passive stressors (such as watching stressful movies) both led to increases in activation of the sympathetic nervous system, and the passive form of stress also was associated with mild bronchoconstriction among people with asthma.

The immune system: During a stressful event or period of time, stress hormones such as cortisol travel to the immune system and have various dysregulating effects. One is by triggering heightened inflammation, which is at the root of many conditions, including cardiovascular disease and dementia, Kiecolt-Glaser said. "When you're stressed, you can get a release of pro-inflammatory cytokines," proteins that affect immune function.

ugh short-term inflammation usually helps the body heal — think about the swelling that develops around a ained ankle, enhancing blood flow to the area — too much or chronic inflammation can turn against healthy cells, making you more vulnerable to infection, less responsive to vaccines and slower to heal. What's more, the release of pro-inflammatory cytokines can travel to the brain and increase the risk of depression. When it comes to stress and depression, "it's a nasty cycle," Kiecolt-Glaser said. "If you're depressed, you sleep poorly and are less likely to exercise, which can increase inflammation and depression."

Stress can lead to depression.

The gastrointestinal system: Stress decreases gastrointestinal motility (slowing emptying of the gut), which can make you feel nauseated, bloated or constipated, said gastroenterologist Cindy Yoshida, a professor of medicine at the University of Virginia Health System in Charlottesville. But the bigger news is: Stress leads to changes in the gut microbiome, affecting the diversity of the bacteria there, and it affects gut barrier function in ways that increase leakiness of the gut. This means bacterial byproducts from the foods you eat can leak outside the GI tract into your circulation, which in turn sets up inflammatory and hormonal responses, Yoshida said.

cause

Among other effects, these changes can exacerbate irritable bowel syndrome and inflammatory bowel disease (IBD). In fact, a study in a 2020 issue of PLOS One found that psychologic stress correlated with flare-ups of Crohn's disease and ulcerative colitis among 1,078 people with IBD — and about 75 percent of the participants were aware of this effect. Adding insult to misery, "there's enough communication between the gut and what's going on in the brain [that] stress can cause leaky gut and leaky gut can also cause anxiety and depression," Yoshida said.

The skin: If you've ever experienced a flare-up of acne or eczema when you were stressed out, you're familiar with the effects of stress on the skin, which is the largest organ of the human body. "We used to think of the skin as a wrapper, keeping our innards in and the outside out," said Rick Fried, a dermatologist and clinical psychologist and clinical director of Yardley Dermatology Associates and Yardley Clinical Research Associates in Pennsylvania. "Over the years, we've come to realize the skin is a very active organ in its own right. It has its own immune system, and it interacts with the brain in a moment-to-moment fashion."

As a result, when you experience acute or chronic stress, the skin's immune system becomes activated, which promotes inflammation, leading to a worsening of skin conditions such as rosacea, psoriasis, hives and eczema.

Stress also can interfere with the skin's ability to hold on to water — and the cascade of stress hormones that are released prompts the sebaceous glands in the skin to produce more oil, which can trigger acne breakouts, said Joshua Zeichner, an associate professor of dermatology at Mount Sinai Hospital. "Within days of a stressful event, we see downstream effects on the skin. The impact of stress on the skin is real." What's worse: This can lead to a vicious cycle where stress can cause a skin condition to act up, which can lead to more distress and exacerbate or prolong the skin problem, Fried said.

Interesting, I did not know that skin is the largest organ of the body. I have expirenced.

The bottom line

Understanding how stress affects the body can help you realize the importance of mitigating it. And for the most part, the damaging effects of stress are somewhat modifiable, experts said.

changeable

If you exercise regularly, get good-quality sleep and take steps to reduce and/or manage your stress, "you can reduce stress activity in the brain, systemic inflammation and your risk of developing cardiovascular disease," Tawakol said.

You also can dial down your reactivity to stress by doing deep-breathing exercises, progressive muscle relaxation, meditation, yoga or aerobic exercise, which will help calm your body's response to it, Fried said.

Adopting such strategies is smart, given that stressful events and situations — both big ones and smaller ones — probably won't go away any time soon. Remember: "It's not just major stressors that matter. Minor stressors that accumulate do, too," Kiecolt-Glaser said, "especially if you don't manage them."

→ Ways to manage and cope with stress.

genre: Infomative, feautred article

Reversed outline:

Part 1: Intro - Briefly mentions some symptoms and different stressors associated with it.

Part 2: how stress impacts the heart

Part 3: how it impacts the nervos system, hormones, respiration...

Part 4: stress can cause inflamation in the ~~ext~~ immune system.

Part 5: how stress impacts the gut.

Part 6: how stress ~~effects~~ the skin. But what about our hair???

Part 7: some ways to deal with stress that have been proven to be scientifically effective.