How stress might be the root of problems like pain, ulcers and a broken heart

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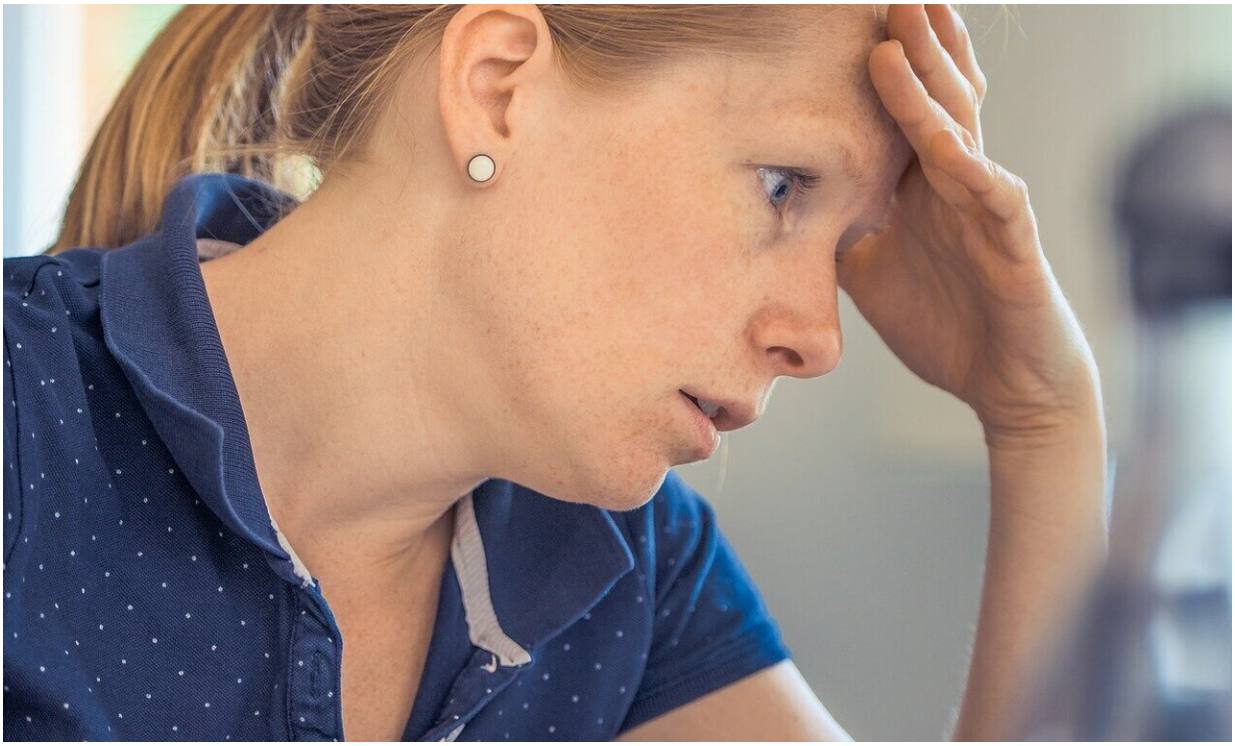

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The English actor Kate Beckinsale recently lost her stepfather. She experienced such intense grief at the loss that it "burned a hole" in her esophagus, causing her to "vomit copious amounts of blood." Beckinsale spent six weeks in hospital recovering.

People often speak about the emotional toll of grief and stress, but often less is said about the effects it can have on other parts of the body. Is it true that grief can cause such profound physical symptoms as vomiting blood? Perhaps. What we do know is that stress is linked to many other conditions that affect almost every system in the body.

Beckinsale was possibly suffering from peptic ulceration. This condition is mainly caused by the bacterium *H pylori*. But some research suggests stress shouldn't be overlooked as a potential cause.

Early observations from Dr. Burrill Crohn (of Crohn's disease fame) described stress ulcers in patients who had undergone a form of severe psychological trauma. Observational studies have since linked stress with peptic ulcers, while others have shown an association between anxiety and depression with the condition. Another study found a link between peptic ulcers and negative life experiences—such as divorce or widowhood.

But ulcers aren't the only health condition thought to be triggered by stress.

Defining stress

Stress can broadly be divided into two main forms: physiological and psychological.

Physiological stressors test our body's physical ability to function. Examples include exposure to extremes of temperature, or shock from blood loss or infection.

Psychological stressors are those that affect mental function—such as loss of a job, assault or bereavement.

You'll see immediately that it's rather a difficult concept to define. Some stressors—such as traumatic injury—could be classified as both physiological and psychological. Each person also responds differently to stress—so the experience between each person is variable, too. This is one of the reasons why investigating the effects of stress is difficult.

Many mental health disorders can be stress-related. Post-traumatic stress disorder (PTSD) is possibly the best-known example of these conditions, which occurs following a traumatic event. Other examples include grief reactions following bereavement or loss, and generalized anxiety disorder—where anxiety is experienced more chronically.

Why symptoms arise

Regardless of the cause, stressors trigger a biological stress response in our body. You're probably already familiar with the physical symptoms that can arise. The heart can start to race and beat more noticeably, sometimes leading to palpitations. Breathing hastens and you might start to feel hot, cold or sweaty. You may even feel shaky, nauseous or numb. In some cases, stress can even cause more severe symptoms, such as chest pain, choking, or a feeling you might faint.

The stress response starts in the brain, which has overriding control of our body. A specific division called the sympathetic nervous system generates "fight and flight responses" to dangers. In addition, part of the adrenal gland known as the adrenal medulla, secretes the action hormone adrenaline. The brain also shares a connection with the hormonal overlord—the pituitary gland, setting off other hormonal circulations within the bloodstream.

Acting together, the sympathetic nervous system and hormonal cascade drive control of the heart, lungs and other organs, but also ignite your metabolism.

These physical responses are an important survival mechanism. Imagine for a moment your leg has just been bitten by a lion. The lion, the bleeding and the fear you feel are the stressors. But if you don't want to stick around and become the lion's next meal, you have no choice but to either fight back or run for your life.

Thankfully, the body's stress response means your nervous system has already powered up your heart and lungs and mobilized your energy sources, making you primed to respond.

But if stress is associated with a severe form of trauma, or occurs too often, this is where symptoms become more chronic and from where you can run into trouble. The translation of psychological stressors into physical symptoms is called "somatisation."

Whole body response

Stress has been found to be a potential cause for conditions across all different body systems, from heart and gut, to the joints and even the pelvic organs.

Nobody knows the exact cause of irritable bowel syndrome, which is associated with bloating, abdominal pain and constipation or diarrhea. Several causes have been postulated, including abnormal activity and oversensitivity of the gut. But another possibility is the effect of stress and the mind.

Other conditions associated with stress and mood include hyperventilation syndrome, fibromyalgia and tension headaches. And there are other conditions more unusual than that.

Takotsubo cardiomyopathy is something of a bizarre entity. Otherwise known as broken heart syndrome, it's the physical manifestation of

either great grief or extreme joy—where emotions become symptoms such as chest pain and shortness of breath. In essence, this demonstrates the ability of extreme stressors to generate heart failure.

These are just some examples of stress becoming physical symptoms. The inherent connection between body and mind occurs on so many different levels, and the complexity of the biological stress response makes it so difficult to quantify and study.

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