

# Broken Heart Syndrome Is on the Rise

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## STORY AT-A-GLANCE

- › Broken heart syndrome is also called Takotsubo syndrome (TTS). Under severe emotional stress the left ventricle of the heart can balloon and trigger what looks like a heart attack
- › Data show that the incidence of TTS was rising before COVID-19 began spreading, especially in middle-aged and older women
- › Scientists have long suspected that the syndrome is associated with a brain-heart connection that can be triggered by a significant emotional trauma, such as a car accident, loss of a loved one, domestic violence, and financial loss
- › It is important to learn how to manage stress to protect your overall health. Consider Emotional Freedom Techniques, meditation, spending more time in nature, breathing through your nose and a combination of vitamin B6 and magnesium

Smidt Heart Institute has published a study in the *Journal of the American Heart Association*<sup>1</sup> in which they found cases of broken heart syndrome are increasing in middle-aged and older women, even before the pandemic. Broken heart syndrome is more than a myth or an old wives' tale. The medical term for the condition is Takotsubo cardiomyopathy (TCM) or Takotsubo syndrome (TTS).

The condition is named after a pot Japanese fishermen use to trap octopi.<sup>2</sup> The diagnosis was first introduced in 1991 by a Japanese scientist.<sup>3</sup> After the 1991 paper was published, doctors found several more cases in the following 10 years, but the

condition remained largely unrecognized outside of Eastern culture. In 2004 after the earthquake in Japan, 16 people were diagnosed with TTS.

This drew attention from scientists in the West who later named the condition broken heart syndrome in reference to those who experience the condition after the death of a loved one. After the spread of COVID-19, the prevalence of depression, anxiety and stress and the general population rose significantly.<sup>4</sup>

A systematic review and meta-analysis of five studies including 9,074 people revealed the rise in the number of psychological disorders that impact mental health during COVID-19.<sup>5</sup> During the U.S. Census Bureau survey in December 2020, more than 42% of Americans reported they had symptoms of anxiety or depression;<sup>6</sup> on the other side of the world in New Zealand, depression and anxiety have exceeded population norms.<sup>7</sup>

Rising levels of stress during the pandemic also increased opioid and stimulant use precipitously.<sup>8</sup> According to the CDC,<sup>9</sup> deaths from drug overdoses had plateaued at 70,122 in the period ending in January 2018. After slightly dropping for a few months, the numbers began rising by November 2019, and the CDC reports the 12 months ending March 2021 there were 96,779 deaths from drug overdoses.

This is approximately a 37% rise in deaths related to drug overdoses that occurred during 2020 and 2021. The fearmongering that occurred over 2020 resulted in significant psychological, economic and social stress on people's lives. Data showed that in addition to the mental health issues and drug overdoses during 2020, there was also a rise in the incidence of TTS, also known as stress cardiomyopathy.<sup>10</sup>

## **Rising Number of Broken Heart Syndrome Before COVID**

The rising number of diagnoses of broken heart syndrome during the COVID-19 pandemic may have been expected. However, recent data show the numbers were on the rise in middle-aged and older women before COVID-19 began spreading across the world.<sup>11</sup>

The researchers examined the trends in diagnosis of TTS and found the incidence has changed across age groups and gender.<sup>12</sup> They analyzed the trends in diagnosis from 2006 to 2017 in patients 18 years and older.

The data were gathered from the National Inpatient Sample database and included 135,463 documented cases. The researchers discovered that the annual incidence increased steadily across both sexes. However, women were diagnosed 88.3% of the time, especially those 50 years and older.

The increase in incidence among middle-aged men was also significant but did not carry over to older men. Interestingly, the proportion of men to women in the U.S. population at risk remained stable over the entire study period.

The researchers acknowledged the analysis was limited by dependence on the correct ICD-9 or ICD-10 diagnosis coding in hospital records. However, they believe that the number of cases documented over nearly two decades demonstrates not only an increasing incidence but:<sup>13</sup>

*"... a steep increase among especially middle-aged to older women. This overall trend was disproportionate to that seen in other subgroups and appears not completely explained by improvements in clinical recognition."*

Before data from this study, scientists knew that women were more prone to TTS than men. This was the first time age- and gender-based differences were identified.<sup>14</sup> Dr. Susan Cheng is the director of research at the Smidt Heart Institute and senior scientist on study. She commented in a press release:<sup>15</sup>

*"Although the global COVID-19 pandemic has posed many challenges and stressors for women, our research suggests the increase in Takotsubo diagnoses was rising well before the public health outbreak. This study further validates the vital role the heart-brain connection plays in overall health, especially for women."*

## **What Is Broken Heart Syndrome?**

People who are experiencing broken heart syndrome describe sudden heart attack-like symptoms that include chest pain and difficulty breathing. However, while a myocardial infarction happens because blocked arteries close off oxygen supply to the heart muscle, TTS is something entirely different.<sup>16</sup>

In some cases, it can be misdiagnosed as heart attack since test results will show changes in rhythm and rising troponin levels consistent with a heart attack. But, unlike a myocardial infarction, other tests will not show blocked arteries. During TTS, the left ventricle will temporarily enlarge and does not pump enough blood. The remainder of the heart will function normally and may even contract more forcefully trying to make up for poor function in the left ventricle.

According to the American Heart Association,<sup>17</sup> the syndrome can lead to severe, short-term heart failure. Most will make a full recovery within several weeks. However, there is no standard treatment.<sup>18</sup> Instead, clinicians must depend on other symptoms, such as low blood pressure or pulmonary edema to determine treatment options. Although death is rare, continued heart failure may happen in about 20% of people.

## **Brain-Heart Connection May Drive Broken Heart Syndrome**

Scientists have long suspected that TTS is associated with a brain-heart connection. One hypothesis suggests the connection between the sympathetic nervous system and how heart cells respond to stress hormones affect the ballooning of the left ventricle.<sup>19</sup> Cheng explains the way the brain and nervous system responds to changes as women age.<sup>20</sup> This may explain in part why TTS is more common in middle-aged and older women.

The emotional and physical triggers may be associated with psychiatric or neurological disorders.<sup>21</sup> Typical neurological changes that are associated with a high risk for TTS include subarachnoid hemorrhages and seizure disorders. Brain alterations in the limbic system and reduced connectivity with the autonomic nervous system may also increase the risk.

Data also suggest that regions of the brain linked with emotional processing and control of heartbeat, breathing and digestion may not communicate in the same way in people without broken heart syndrome.<sup>22,23</sup> Study author Christian Templin, professor of cardiology at University Hospital Zurich, said in a news release:<sup>24</sup>

*"For the first time, we have identified a correlation between alterations to the functional activity of specific brain regions and TTS [takotsubo cardiomyopathy], which strongly supports the idea that the brain is involved in the underlying mechanism of TTS.*

*Emotional and physical stress are strongly associated with TTS, and it has been hypothesized that the overstimulation of the autonomic nervous system may lead to TTS events."*

Events that have been known to trigger broken heart syndrome are:<sup>25,26</sup>

Car or other accident	Asthma attack
Serious illness, surgery or medical procedure	Death or serious illness or injury to a loved one, including a pet
Domestic violence	Financial loss
Intense fear	Public speaking
Sudden surprise	Job loss

## **Consider These Stress Management Strategies**

Scientists believe the link between broken heart syndrome and middle-aged and older women is the release of stress hormones that affect the heart cells during challenging events. Sometimes extreme stress is unavoidable, but managing daily stress is one way to protect your overall health from its ill effects.

In any case, if you experience chest pain after a stressful event it's a good idea to get medical help right away to rule out a heart attack or broken heart syndrome.

One way to reduce your risk for TTS and other stress related conditions is to help manage your stress levels and therefore your stress hormones. Here are several strategies that can help you take control of your health and reduce stress.

**Emotional Freedom Techniques (EFT)** – The process is also called tapping and it's a tool that can help free your mind to fully address challenges without fear.<sup>27</sup> This is one of my favorite techniques to help reduce stress and increase creative problem-solving.

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**Stop excessively watching bad news** – COVID-19 is not the only bad news carried on mainstream media each day. While this strategy addresses your chronic stress levels, it can also have an impact on your resilience to an acute stress event. Your ability to adapt to situations, including adversity, trauma and tragedy, is part of resilience.

Some research-based exercises<sup>28</sup> that help to foster resilience are to change the narrative going on in your head, practice compassion for yourself, meditate and cultivate forgiveness for your own mental and physical health.

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**Meditation** – There is growing evidence that meditation can reduce age-related brain atrophy<sup>29</sup> and improve productivity.<sup>30</sup> There are two common styles of meditation. Mindfulness is a practice of keeping your attention in the present moment in all activities.

Self-induced transcendence<sup>31</sup> is a non-directed style of meditation in which you access a fourth state of consciousness that is different from waking, sleeping and dreaming.

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**Spending more time in nature** – One study<sup>32</sup> published in Scientific Reports found that spending 120 minutes a week in nature was associated with better health and

well-being. It didn't appear to matter how those 120 minutes were broken up during the week.

The researchers in this study also didn't find that more was necessarily better. In other words, the positive association of spending time outdoors peaked between 200 and 300 minutes each week. After that, there was no further gain.

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**Gardening** – A meta-analysis of the literature,<sup>33</sup> which included 22 case studies published after 2001, compared data from the U.S., Europe, Asia and the Middle East. The researchers found there was a wide range of health benefits to gardening which included a reduction in body mass index, depression and anxiety. The participants also reported better life satisfaction, quality of life and sense of community.

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**Combination of magnesium and vitamin B6** – One study<sup>34</sup> published in PLOS One discovered that when magnesium and vitamin B6 were taken together, there was a complementary effect that reduced stress. Past studies had shown the effect in animals. In this human study the researchers found the treated group reported a 44.9% reduction in perceived stress.

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**Living near the ocean** – Many people dream of living near the ocean and according to one study<sup>35</sup> from the University of Exeter, England, it may be good for mental health. Using data from the Health Survey for England of 25,963 adults from 2008 to 2012, the researchers compared health to the respondent's proximity to the sea.

They found even in those that lived from 1 kilometer to 5 km (0.6 to 3.1 miles) from the coast, there was a 25% lower risk of poor mental health compared to those that lived further away.<sup>36</sup>

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**Breathing through your nose** – Breathing through your nose slows breathing and makes it more regular. This improves oxygenation. It also activates your parasympathetic nervous system, which is a calming effect and lowers your blood pressure. Mouth breathing tends to lead to over-breathing and failing to exhale fully.

Although most people breathe between 12 and 14 breaths per minute,<sup>37</sup> research published in the medical journal *Breathe* has suggested that an optimal respiratory rate is in the range of six to 10 breaths per minute. This has been shown to be beneficial to your respiratory, cardiovascular, cardiorespiratory and autonomic nervous systems.<sup>38</sup>

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**Sleep** — Matthew Walker, Ph.D., is a professor at UC Berkeley and the author of "Why We Sleep." He says insomnia may be the result of an amplified fight-or-flight nervous system.<sup>39</sup> Cortisol can play a role, so people who have trouble falling asleep typically have a spike in the stress hormone cortisol at bedtime and an overactive sympathetic nervous system.

Wakefulness is also associated with mitochondrial stress. Without sufficient sleep, neuron degeneration sets in, which can lead to dementia.<sup>40,41</sup>

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