

# Fitness trackers find new symptom of depression—body temperature

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When a group of California researchers started a COVID-19 study in 2020 using fitness tracking rings, they didn't know they would make a leap forward for an entirely different condition.

In the earliest days of the pandemic, more than 20,000 people from 106 different countries signed up to participate in the TemPredict Study from the University of California, San Francisco, according to a Feb. 5 paper published in the journal *Scientific Reports*.

The researchers set out to learn if off-the-shelf fitness and health trackers worn on the body could be used to detect the early symptoms of COVID-19, according to the study.

All participants, 20,880, bought and wore an Oura Ring, a ring that senses such data as [heart rate](#), body [temperature](#), oxygen levels and other fitness indicators, the researchers said.

Over the course of seven months, the participants submitted their vital signs collected by the ring and stored in a phone app, and also self-reported their emotions and mental health in daily surveys.

Could the ring predict COVID-19? Yes, the researchers found. The ring picked up signs the participants may have been infected on average 2.75 days before they tested positive, according to the study.

But that wasn't the only data that stood out to the research team.

The study found that participants with higher body temperatures also reported higher rates of depressive symptoms and feelings of depression using temperatures taken while users were awake.

"Specifically, these analyses replicated prior results showing that daytime self-reported body temperature was associated with greater depressive symptoms and build on one prior study showing that the asleep-awake body temperature difference was more than twice as large among controls relative to individuals with depression," the researchers said in the study.

While it's not clear if poor body temperature regulation is a symptom of depression or vice versa, the researchers said people with depression overall had a change to their natural immune-based feedback system.

This means that while other people go through natural temperature cycles throughout the day and over time, people experiencing depression were not, and found it harder to self-cool their bodies, according to the study.

It could be a way in for non-pharmaceutical treatment.

"Ironically, heating people up actually can lead to rebound body temperature lowering that lasts longer than simply cooling people down directly, as through an ice bath," lead author Ashley Mason said in a news release. "What is we can track the body temperature of people with depression to time heat-based treatments well?"

Mason said there is an existing small body of research that suggests putting people in hot tubs or saunas can trigger the body to self-cool, causing them to sweat. If thermoregulation is a symptom of depression, as the Oura Ring study suggests, temperature treatment could be an effective way to treat depression.

"To our knowledge, this is the largest study to date to examine the association between body temperature—assessed using both self-report methods and wearable sensors—and depressive symptoms in a geographically broad sample," Mason said. "Given the climbing rates of depression in the United States, we're excited by the possibilities of a new avenue of treatment."

The rising popularity of fitness trackers may also help more people identify symptoms of [depression](#).

About one in five adults wore a fitness tracker, either as a band or smartwatch, in 2020, according to the Pew Research Center.

Oura, the company that developed the Oura Ring, reports more than 1 million people use their ring to track their sleep, blood [oxygen levels](#), heart rate during workouts, and even their levels of stress, according to the website.

Many Americans also support companies using data from fitness trackers for medical research, the Pew Research Center found.

About 40% of adults in the U.S. said they would support data being used from their fitness tracker if it was being used for heart disease research, for example.

With increased use of fitness trackers and large-scale research studies analyzing the data, people across the globe may be able to play a part in solving medicine's mysteries.

**More information:** Ashley E. Mason et al, Elevated body temperature is associated with depressive symptoms: results from the TemPredict Study, *Scientific Reports* (2024). [DOI: 10.1038/s41598-024-51567-w](https://doi.org/10.1038/s41598-024-51567-w)

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