

As global temperatures rise, so will mental health issues, study says

By Susan Scutti, CNN

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(CNN) — No matter where we live, weather touches each of us daily and the warming effects of climate change go beyond the physical environment.

Survey data for 2 million people were linked to meteorological data for the new study

Small rises in temperature and dramatic weather events resulting from warming can affect mental health

Lab. "For example, is poor sleep due to hot temperatures the thing that produces mental health problems? We have a lot of work to do to figure out precisely what is causing what."

A rise in average monthly temperatures is tied to a small increase in mental health issues, according to a [study](#) published Monday in the journal PNAS. And over five years, a 1 degree Celsius increase in average temperature results in an even greater prevalence of mental difficulties.

"We don't exactly know why we see high temperatures or increasing temperatures produce mental health problems," said [Nick Obradovich](#), lead author of the study and a research scientist at the Massachusetts Institute of Technology's Media

Some answers, more questions

Based on temperature records beginning about 1850, our globe is about 1 degree Celsius hotter today than it was between 1850 and 1900, according to [climate scientists](#).



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grumpiness or day-to-day emotional [agitation]."

Next, he and his colleagues linked the mental health reports to meteorological data from the city where each respondent lived. "We had this nice decade's worth of information about how environmental conditions related to the way people reported their mental health status," Obradovich said.

The research team analyzed the data in three ways.

First, they looked at temperatures and precipitation over a 30-day period and compared that to mental health.

For the study, Obradovich and his colleagues combined data from the US Centers for Disease Control and Prevention's Behavioral Risk Factor Surveillance System, which includes self-reported personal mental health data on nearly 2 million randomly sampled US residents, with daily meteorological data from 2002 through 2012.

The Behavioral Risk Factor Surveillance survey might be the largest public health monitoring survey in the world, Obradovich explained. "We gathered about a decade's worth of data from this survey, which is about 2 million people responding to the same question. The question basically asks: How, over the recent period, has your mental health status been?"

Survey respondents reported "anything that falls within the range of stress, anxiety, depression, emotional issues"; this "basically means things that are less extreme than hospitalization and suicide but more significant than like



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be accounted for, the new study allows the researchers to say only that, on average, "warming over time associates with worsened mental health over time," he said. "There are many other place-specific factors that may moderate the effect."

'Stress and despair'

[Dr. Jonathan Patz](#), a professor and director of the Global Health Institute at the University of Wisconsin-Madison, said the study is consistent with recent work by other scientists, including [his own recent research](#) on heat waves and hospital admissions in Milwaukee, Wisconsin, over a 17-year period, he said. Patz and his co-authors found

"Exposure to hotter temperatures and higher rates of precipitation in that period produced increases in the probability that people were going to report some mental health problem in that period," Obradovich said.

Specifically, the shift from average monthly temperatures between 25 degrees Celsius (77 degrees Fahrenheit) and 30 degrees Celsius (86 Fahrenheit) to averages greater than 30 related to a 0.5 percentage point increase in the probability of mental health difficulties. If this exact change in temperature were generalized across the nation, "that would produce approximately 2 million additional individuals reporting mental health difficulties," Obradovich explained.

Next, the team analyzed longer-term warming and mental health reports in individual cities. Here, they found that five-year warming by just 1 degree Celsius was linked to a 2 percentage point increased prevalence of mental health issues.

Finally, the team examined mental health reports from people affected by Hurricane Katrina and compared them to reports from people in comparable-sized places that had not been affected by the catastrophic hurricane. Experiencing Katrina was linked to a 4 percentage point increase in the prevalence of mental health problems.

Overall, those most vulnerable to the climate change effects studied include people with lower incomes, individuals with existing mental health problems and women, the research indicated.

So, why don't people who live in warmer places generally have worse mental health than people in colder places? Obradovich said that is one of the "outstanding questions in identifying the social impacts of climate change." Because certain factors, such as lifetime adaptations to climate, cannot

that high temperatures impacted admissions for self-harm, including attempted suicide.



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Patz, who was not involved in the new research, said the strength of the study includes the high number of participants but noted that the data are "based on a single question about one's mental health and only at the monthly level."

"The most important point of this [new] study is that climate change, indeed, is affecting mental health, and certain populations (women and the poor) are disproportionately impacted," Patz, who called for more research on climate change, wrote in an email.

He also said the study may underestimate the negative effects linked to changing climate, and there might be "stress and despair" occurring "as governments and industry fail to react at the pace recommended by multiple scientific assessments."

Obradovich, who noted that some people near the coast may be feeling anxiety about the possibility of hurricane damage to their homes, agreed: "There could be additional effects of worry about climate change that we're not able to capture in this study."