

Hot Temperatures and Suicide Risk: New Insight into a Complex Topic

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Suicide is a major public health concern with more than 800,000 deaths each year worldwide.¹ It is the second leading cause of death in young people 15–29 years of age.¹ Previous studies have linked higher temperatures to increased suicide—a growing concern as the average global temperature rises.² Some past studies have reported a linear relationship—in other words, the higher the temperature, the higher the relative risk of suicide—whereas others have found evidence of a nonlinear association. A recent study in *Environmental Health Perspectives* pooled climate and health data across multiple sites to further explore the exact shape of the association.³

Using a time-stratified case-crossover analysis, the researchers examined the short-term temperature–suicide relationship across 341 locations on five continents. The study periods for the original analyses varied from 4 to 40 years. Modeling showed that, among all countries pooled together, the relationship between temperature and relative risk of suicide was an inverted J-curve rather than linear—risk increased in tandem with temperatures to the 93rd percentile of temperature (27°C/80.6°F), after which it flattened out or slightly declined.

The scientists also assessed the relationship between suicide and temperature within countries. In Western countries (United States, United Kingdom, Spain, Switzerland, and Canada) and in South Africa, the relationship between temperature and relative risk was nearly linear, consistent with earlier findings in the United States and Mexico.⁴ In contrast, the relationship in Japan, South Korea, and Taiwan fit the inverted J-curve.

“When we started this study, we hypothesized that the difference in shapes of curves . . . was due to different climates—linear in cooler areas versus nonlinear in warmer areas,” says lead author Yoonhee Kim, an associate professor in the Graduate School of Medicine at the University of Tokyo. The authors speculate that all regions may have an inverted J-curve but that East Asian countries have many more hot days than temperate Western countries, allowing more precise investigation at the hottest end of the temperature spectrum. They do note that other country-level characteristics may affect the curve shape, such as the rate of antidepressant use.

The paper “is an important contribution to suicidology, as well as to public health and suicide prevention,” says Timo



Suicide is a complex event that is influenced by many individual and societal factors. But it is preventable, the authors write, and a better understanding of suicide epidemiology may strengthen prevention efforts at a population level. Image: © iStockphoto/Artem Peretiako.

Partonen, a research professor at the Finnish National Institute for Health and Welfare who was not involved in the new report. “There are several strengths of this work, including the big number and wide distribution of locations where the data on the daily means of outdoor temperatures were collected, the relatively long study periods for most of these locations, . . . and the sophisticated methods used for statistical analysis.”

Tamma Carleton, a postdoctoral scholar at the University of Chicago’s Energy Policy Institute, agrees. “Applying the same methodology across diverse contexts enables the authors to quantify differences in the suicide–temperature relationship across different regions of the world,” she says, and the large data set enabled a breakdown by gender and age. “Because suicides on average tend to be higher in the elderly in many countries and in men in nearly all countries, I was surprised to see that the relative risk of suicide due to temperature was indistinguishable across age groups and genders, at least in most countries,” Carleton says.

The researchers adjusted for seasons based on the calendar but not for thermic seasons (based on temperature) or astronomical seasons (based on the length of day), which Partonen feels is a weakness. His own work in Finland found that global radiance may be an important factor in suicide risk at higher Northern latitudes.⁵ In addition, says Carleton, omitting populations outside major urban areas, except for within Japan and the United Kingdom, limits

its generalizability. “As shown in previous work,⁶” she says, “rural and/or agriculturally dependent populations may respond very differently to changes in climatic conditions.”

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