Could living at high altitude increase suicide risk? Evidence suggests possible treatments

March 10 2018

Credit: CC0 Public Domain

High-altitude areas—particularly the US intermountain states—have increased rates of suicide and depression, suggests a review of research evidence in the *Harvard Review of Psychiatry*.

The increased suicide rates might be explained by blood oxygen levels due to low atmospheric pressure, according to the article by Brent Michael Kious, MD, PhD, of University of Utah, Salt Lake City, and colleagues. Pending further research, the evidence may point to possible treatments to reduce the effects of low blood oxygen on mood and suicidal thoughts.

Altitude Linked to Variations in Suicide Rate - Further Study of Mechanisms Needed

The researchers reviewed and analyzed previous evidence linking higher altitude of residence to increased risk of suicide and depression, and considered possible explanations for these associations. "There are significant regional variations in the rates of major depressive disorder and suicide in the United States, suggesting that sociodemographic and environmental conditions contribute," Dr. Kious and coauthors write.

They analyzed 12 studies, most performed in the United States, including population-based data on the relationship between suicide or depression and altitude. While the studies used varying methods, most reported that higher-altitude areas had increased rates of depression and suicide. In general, the correlation was stronger for suicide than for depression.

The highest suicide rates were clustered in the intermountain states: Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming. (Alaska and Virginia also had high suicide rates.) In a 2014 study, the percentage of adults with "serious thoughts of suicide" ranged from 3.3 percent in Connecticut (average altitude 490 feet) to 4.9 percent in Utah (average altitude 6,100 feet).

Other key findings from previous research on altitude and suicide

included:

- Populations living at higher altitudes had increased suicide rates despite having decreased rates of death from all causes. Rather than a steady increase, the studies suggested a "threshold effect": suicide rates increased dramatically at altitudes between about 2,000 and 3,000 feet.
- Suicide rates were more strongly associated with altitude than with firearm ownership. Other factors linked to suicide rate included increased poverty rate, lower income, and smaller population ratios of white and divorced women. However, the studies could not account for all factors potentially affecting variations in suicide, such as substance abuse rates and cultural differences.
- While more than 80 percent of US suicides occur in low-altitude areas, that's because most of the population lives near sea level. Adjusted for population distribution, suicide rates per 100,000 population were 17.7 at high altitude, 11.9 at middle altitude, and 4.8 at low altitude. Studies from some other countries, but not all, also reported increased suicide rates at higher altitudes.

Why would altitude affect suicide rates? Dr. Kious and coauthors suggest the answer might be "chronic hypobaric hypoxia": low blood oxygen related to low atmospheric pressure. That theory is supported by studies in animals and short-term studies in humans. The authors suggest two pathways by which hypobaric hypoxia might increase the risks of suicide and depression: by altering the metabolism of the neurotransmitter serotonin and/or through its effects on brain bioenergetics.

If borne out by future studies, these mechanisms suggest some possible treatments to mitigate the effects of altitude on depression and suicide risk: supplemental 5-hydroxytryptophan (a serotonin precursor) to

increase serotonin levels, or creatinine to influence brain bioenergetics. Dr. Kious and colleagues identify several areas in need of further research, including the effects of prolonged exposure to altitude on both serotonin metabolism and brain bioenergetics.

More information: Brent M. Kious et al. Living High and Feeling Low, *Harvard Review of Psychiatry* (2018). DOI: 10.1097/HRP.0000000000000158

Provided by Wolters Kluwer Health

Citation: Could living at high altitude increase suicide risk? Evidence suggests possible treatments (2018, March 10) retrieved 17 April 2024 from https://medicalxpress.com/news/2018-03-high-altitude-suicide-evidence-treatments.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.