Vitamin D levels appear to play role in COVID-19 mortality rate

·May 11, 2020 this correlation might help explain the many mysteries surrounding COVID-19, such as why children are less likely to die. Image is in the public d*Summary: COVID-19 patients from countries with higher mortality rates for the infection had lower levels of vitamin D compared to those from countries with lower mortality rates. Findings suggest a link between vitamin D deficiency and an increased risk of both more severe coronavirus infection and mortality as a result of contracting the virus.ource: Northwestern University* that vitamin D deficiency might play a role in mortality, we don't need to push vitamin D on everybody," said Northwestern's Vadim Backman, who led the research. "This needs further study, and I hope our work will stimulate interest in this area. The data also may illuminate the mechanism of mortality, which, if proven, could lead to new therapeutic targets."

"Instead, we saw a significant correlation with vitamin D deficiency," he said.

By analyzing publicly available patient data from around the globe, Backman and his team discovered a strong correlation between vitamin D levels and cytokine storm — a hyperinflammatory condition caused by an overactive immune system — as well as a correlation between vitamin D deficiency and mortality.

"Cytokine storm can severely damage lungs and lead to acute respiratory distress syndrome and death in patients," Daneshkhah said. "This is what seems to kill a majority of COVID-19 patients, not the destruction of the lungs by the virus itself. It is the complications from the misdirected fire from the immune system."

This is exactly where Backman believes vitamin D plays a major role. Not only does vitamin D enhance our innate immune systems, it also prevents our immune systems from becoming dangerously overactive. This means that having healthy levels of vitamin D could protect patients against severe complications, including death, from COVID-19.

"Our analysis shows that it might be as high as cutting the mortality rate in half," Backman said. "It will not prevent a patient from contracting the virus, but it may reduce complications and prevent death in those who are infected."

Backman said this correlation might help explain the many mysteries surrounding COVID-19, such as why children are less likely to die. Children do not yet have a fully developed acquired immune system, which is the immune system's second line of defense and more likely to overreact.

"Children primarily rely on their innate immune system," Backman said. "This may explain why their mortality rate is lower."

Backman is careful to note that people should not take excessive doses of vitamin D, which might come with negative side effects. He said the subject needs much more research to know how vitamin D could be used most effectively to protect against COVID-19 complications.

"It is hard to say which dose is most beneficial for COVID-19," Backman said. "However, it is clear that vitamin D deficiency is harmful, and it can be easily addressed with appropriate supplementation. This might be another key to helping protect vulnerable populations, such as African-American and elderly patients, who have a prevalence of vitamin D deficiency."

Backman is the director of Northwestern's Center for Physical Genomics and Engineering and the associate director for Research Technology and Infrastructure at the Robert H. Lurie Comprehensive Cancer Center at Northwestern University.

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Abstract

The Possible Role of Vitamin D in Suppressing Cytokine Storm and Associated Mortality in COVID-19 Patients

Background
Large-scale data show that the mortality of COVID-19 varies dramatically across populations, although the cause of these disparities is not well understood. In this study we investigated whether severe COVID-19 is linked to Vitamin D (Vit D) deficiency.

Method
Daily admission, recovery and deceased rate data for patients with COVID-19 from countries with a large number of confirmed patients (Germany, South Korea (S. Korea), China (Hubei), Switzerland, Iran, UK, US, France, Spain, Italy) as of April 20, 2020 were used. The time-adjusted case mortality ratio (T-CMR) was estimated as the number of deceased patients on day N divided by the number of confirmed cases on day N-8. The adaptive average of T-CMR (A-CMR) was further calculated as a

metric of COVID-19 associated mortality in different countries. Although data on Vit D level is not currently available for COVID-19 patients, we leveraged the previously established links between Vit D and C-Reactive Protein (CRP) and between CRP and severe COVID-19, respectively, to estimate the potential impact of Vit D on the reduction of severe COVID-19.

Findings
A link between Vit D status and COVID-19 A-CMR in the US, France, and the UK (countries with similar screening status) may exist. Combining COVID-19 patient data and prior work on Vit D and CRP levels, we show that the risk of severe COVID-19 cases among patients with severe Vit D deficiency is 17.3% while the equivalent figure for patients with normal Vit D levels is 14.6% (a reduction of 15.6%).

Interpretation
Given that CRP is a surrogate marker for severe COVID-19 and is associated with Vit D deficiency, our finding suggests that Vit D may reduce COVID-19 severity by suppressing cytokine storm in COVID-19 patients. Further research is needed to account for other factors through direct measurement of Vit D levels.