

Weather and Climate Conditions Possible Impact on COVID-19 Spread

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SHORT COMMENTARY

The new Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2) pandemic was first identified at the end of 2019 and has resulted in one of the world's most significant public health catastrophes in recent years. We review the current literature on the impact of weather (temperature, humidity, precipitation, wind, etc.) and climate (temperature as an essential climate variable, solar radiation in the ultraviolet, sunshine duration) variables on SARS-CoV-2 and discuss their implications for the COVID-19 pandemic in this paper. The majority of research shows a negative link between ambient temperature and humidity on the one hand and the frequency of COVID-19 cases on the other, while others show no correlation or even a positive correlation. The urban environment, specifically the rate of air ventilation, as well as air pollution, is likely to have an impact on COVID-19 transmission dynamics and case fatality rates. It's uncertain if the extent of the influence of temperature or humidity on COVID-19 is confounded by the widespread public health interventions implemented during the first pandemic wave, due to the inherent limitations in previously published studies.

The results of prior published studies that used measurements from specific nations were contradictory when it came to the effect of weather and climate variables on COVID-19. In particular, most research found a negative link between temperature or other meteorological variables and the number of COVID-19 cases, whereas others found a positive correlation. The reverse link between weather (i.e. temperature or humidity) and climate (i.e. site incident UV radiation, sunshine duration) and COVID-19 is the most plausible scenario, based on the findings from localised and global assessments. However, it is unclear whether the drop in transmission and hence COVID-19 instances is related to the public health actions that occurred or if the decline is due to the rise in temperature or humidity. There was no significant link

between the current climatic conditions and COVID-19 when the latter covariates were included in the model.

Although the effect of weather and environment variables, as reported in the past for other coronaviruses or influenza virus, cannot be ruled out, it may be difficult to detect under the conditions of the first pandemic wave, when many measures were implemented. Containment measures have been found in studies to have a far higher impact than weather and climate variables, which can only explain 18% of the variation in COVID-19 doubling time. Human mobility and the impact of imported cases are two other crucial variables for COVID-19 transmission, as noted in various researches examining the impact of climate on SARS-CoV-2 transmission.

COVID-19 transmission can potentially be hampered by air pollution. Ventilation and air changes rate in a region are two significant parameters linked with virus transmissibility. The rate of ventilation in high-population, high-building-density locations is limited, and specific measures are required to improve public health. Although air pollution is likely to affect the COVID-19 case fatality rate, more research is needed to draw conclusions regarding the effect of these variables on COVID-19 due to many shortcomings in previously published studies.

Although the impact of weather and climate variables on the COVID-19 transmission rate appears to be plausible, a firm determination on the magnitude of the impact requires more research. On the contrary, the increase in COVID-19 cases during the summers in nations with high ambient temperatures indicates that, in the absence of public health measures, weather and climate variables will not be able to prevent outbreaks from resurfacing. In order to accurately quantify the impact of weather and climate variables on the COVID-19 transmission rate and the consequent number of cases, more research is needed, particularly in the absence of public health initiatives.

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