

The effect of temperature on the dynamics of the COVID-19 pandemic: the BERLIN example

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Background:

Studies have shown, ambient temperature can affect the transmission and survival of coronaviruses. This study aimed to determine whether the number of COVID-19 cases and 14-day fatality rates (FR) in Berlin are associated with temperature.

Methods:

Within the scope of this study, a total of 240 days of Berlin belonging to the dates 28.08.20- 24.04.21 were examined. Daily highest temperature, lowest temperature, daily average temperature, number of daily cases, number of deaths were accessed free from the berlin.de and weather.com site. In addition, the incubation period of COVID-19 was assumed to be 14 days, and the fatality rates of 14 days and the average temperatures of these days were calculated. The relationship between the data was evaluated with the Spearman correlation test.

Results:

When the 240 days are examined, the average daily temperature varies between -7.5- 23.5 °C, the fatality rates of 14 days vary between 0- 7,3%. The period with the highest fatality rate of 14 days is between 29.1.21-11.2.21 (FR = 7.3%) and the average temperature of this period (-1.8 °C) is the 14 days with the lowest average temperature. Very strongly negative relationship ($r = -0.920$; $p < 0.001$) was determined between FR and 14-day average temperature. It was noted that as the daily temperature decreased, the number of deaths per day ($r = -0.695$; $p < 0.001$) and the number of daily cases ($r = -0.296$; $p < 0.001$) increased. 1 °C decrease in temperature was associated with an increase in daily new deaths by 1.29 (B = -1.29, 95% CI: -1.55, -0.1.09; $p < 0.001$, Adj. R2 = 0.3).

Conclusions:

Our analysis results showed that the number of COVID-19 daily cases and 14-day fatality rate increased with a low temperature in the Berlin sample.

Key messages:

- Temperature showed a negative correlation between COVID-19 fatality rate.
- Further evaluation may be required globally with more data to determine temperature and COVID-19 cases.