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Letter to the Editor

Will the COVID-19 become active or slowdown in different weather?

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Dear Editor

The Coronavirus Disease 2019 (COVID-19) is caused by acute respiratory syndrome coronavirus-2 (SARS-CoV-2) and has been spread around the world for ten months. COVID-19 already caused more than 660,000,000 cases, with 6,670,000 deaths. The epidemic has not yet stabilized at the current time. With the change in the weather, it is not known if there will be a seasonal change of COVID-19. Will the COVID-19 epidemic continue or slow spread later on? It's shown that the weather, especially temperature and humidity, is one of the crucial factors for the spreading of infectious diseases.

The mode of transmission of SARS-CoV-2 includes respiratory droplets within a long distance of 2m or by contaminated surfaces through contact transmission [1]. Since the genomic structure of SARS-CoV-2 is like other coronaviruses such as HCoV-OC43 and HCoV-HKU1, it is hypothesized that the pathogenesis is probable the same [2,3].

In 2007, **Lowen AC et al.** found that aerosol spread of the influenza virus depends on the ambient temperature and relative humidity using guinea pig as a model. High temperature and humidity expurgated the transmission of the influenza virus. Because air holds more moisture at a warm temperature, respiratory droplets in cough or sneezes drop to the ground when it is much heavier at the time of increased humidity in the summer season. The influenza virus does not easily hold the respiratory droplets in dry and cold air. At the same time as the function of mucus in the nose could be impaired when the humidity in winter is relatively low [4].

There is another study from Wuhan in China indicated that there was a positive association between COVID-19 daily death counts and diurnal temperature range, but a negative association for relative humidity. These results showed that the risk of dying from COVID-19 decreases proportionally to the absolute humidity increases. Dry air-breathing might cause the infection of an upper respiratory system because of the damage of epithelial and reduction of mucociliary clearance [5]. One more study found that if the average temperature and absolute humidity higher than 64.4F (18^{o}C) and 9g/m^{3} respectively, the number of COVID-19 cases would be decreased to 6%. That indicates that

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humidity acts as a significant factor again transmission of SARS-CoV-2 because the air moisture is tricky and ineffective to spread in the warmer season [6]. If these consequences will be relevant to the SARS-CoV-2, it's considered that the transmission of SARS-CoV-2 would be decreased either in summer or winter.

One explanation is that ultra-violet radiation could inhibit SARS-CoV-2, especially in the summer season. Based on a previous study, the spread of the influenza virus brings down when the temperature is raised because the sunlight consists of ultra-violet radiation. It is supposed that the transmission of SARS-CoV-2 might decrease or even disappear when the temperature and ultra-violet radiation increase. However, it's found that SARS-CoV-2 transmission could not be reduced under high temperatures and ultra-violet radiation recently. There is no association of SARS-CoV-2 transfer with heat and ultra-violet radiation [7]. Nevertheless, the experiments were conducted in some of the cities from China only and did not involve other places, so these results required time for further assessment. There is a recent investigation in Brazilian thought that higher temperatures and relative humidity favored COVID-19 transmission. That was differently reported from the coldest countries [8].

All the above information indicates that there is no evidence to support the SARS-CoV-2, either activation or inactivation at the end of this year. There is much work to be done to find out the characteristic of the novel coronavirus SARS-CoV-2. Which seasons are more efficient for transmission of SARS-CoV-2? What are the mechanisms of this? These are unknown yet and require time for further investigation and explanation.

Author contributions

All authors contributed to the concept, acquisition, and analysis of data, drafting of the article, and critical revision for important intellectual content.

Conflicts of interest

The authors have no conflicts of interest to disclose.

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References

1- **Peng PWH, Ho PL, Hosta SS.** Outbreak of a new coronavirus: what anaesthetists should know. Br. J. Anaesth 2020;124(5):497-501.

2- **Geller C, Varbanov M, Duval RE.** Human Coronaviruses: Insights into Environmental Resistance and Its Influence on the Development of New Antiseptic Strategies. Viruses 2012;4(11):3044-3068.

3- **Gorbalenya AE, Baker SC, Baric RS, de Groot RJ, Drosten C, Gulyaeva AA, et al.** severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. Nat. Microbiol 2020;5:536-544.

4- **Lowen AC, Mubareka S, Steel J, Palese P.** Influenza Virus Transmission Is Dependent on Relative Humidity and Temperature. PLoS Pathology 2017;3(10):e151.

5- **Ma Y, Zhao Y, Liu J, He X, Wang B, Fu S, et al.** Effects of temperature variation and humidity on the death of COVID-19 in Wuhan, China. Sci. Total Environ 2020;724:138226.

6- **Islam N, Bukhari Q, Jameel Y, Shabnm S, Erzurumluoglu AM, Siddique MA, et al.** COVID-19 and climatic factors: A global analysis. Environ Res 2021;193:110355.

7- **Yao Y, Pan J, Liu Z Meng X, Wang W, Kan H, et al.** No Association of COVID-19 transmission with temperature or UV radiation in Chinese cities. Eur. Respir. J 2020;55(5): 2000517.

8- **Auler AC, Cássaro FAM, Silva VO, Pires LF.** Evidence that high temperatures and intermediate relative humidity might favor the spread of COVID-19 in tropical climate: A case study for the most affected Brazilian cities. Sci. Total Environ 2020;729:139090.

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