Short report – COVID-19 and weather parameters: Pune, India

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Abstract. – Weather parameters may have some role in determining the spread of Coronavirus disease 2019. Daily data on COVID-19 from Pune, India were collected from 17th May to 4th July 2020 and analyzed with such parameters. Relative humidity was found to have a positive relationship with the number of daily cases, even after taking a lag period of one week. Further studies may be helpful in understanding such relationships.

Key Words:
   COVID-19, Weather parameters, India.

Weather parameters are known to influence the transmission of Coronavirus[1,2]. Meo et al[3] also support the impact of weather parameters on the present pandemic.

Amidst speculations about the impact of weather on the pandemic, the weather data of Pune, India (18°31′N 73°51′E) were considered with daily cases. Till 13th August 2020, the district has recorded more than 115,000 cases[4].

Data were collected from 17th May to 4th July 2020[5,6]. For analysis, daily new cases were taken into account, with maximum, minimum and average (arithmetic mean of maximum and minimum) temperature, Daily Temperature Range (DTR = difference between the maximum and minimum temperature) and relative humidity (RH), recorded at 8:30 AM and 5:30 PM (termed as RH1 and RH2, respectively). The daily new cases were compared with weather parameters, using correlation coefficient. A similar set was also considered, taking a lag period of one week between weather parameters and daily new caseload.

Taking log of absolute number of daily cases as function of weather parameters, two different sets of scenarios were considered (Table I). In 1st instance, RH, especially RH2, was seen to exert a positive impact on the number of daily cases, while maximum temperature, average temperature and DTR were having weak negative relationship with daily cases. In the 2nd instance, taking a lag of one week, the impact of RH1 and RH2 seemed to be greater (r= 0.306 and 0.496, respectively) than the previous model. The influence of maximum temperature, average temperature and DTR seemed to be moderately negative on the daily cases.

Conclusion

There are several other factors like migration and public health intervention strategy that determine the direction of the pandemic. In the future, more analysis is warranted for exploring the pos-

Table I. Relationship between COVID-19 transmission and weather parameters.

	Correlation coefficient with number of daily cases	Correlation coefficient with number of daily case (One-week lag)
RH1	0.186	0.306
RH2	0.386	0.496
Maximum Temperature	- 0.259	- 0.386
Minimum Temperature	- 0.039	- 0.179
Daily Temperature Range	- 0.302	- 0.376
Average Temperature	- 0.213	- 0.373

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sible role of weather parameters on COVID-19 pandemic, after accounting for all confounders.

Conflict of Interest

The Author declares that he has no conflict of interests.

CRediT Authorship Contribution Statement

MPR reviewed the paper and wrote the manuscript.

References

1) Killerby ME, Biggs HM, Haynes A, Dahl RM, Mustaquim D, Gerber SI, Watson JT. Human coronavirus circulation in the United States 2014–2017. J Clin Virol 2018; 101: 52-56.

2) Morikawa S, Kohdera U, Hosaka T, Ishii K, Akagawa S, Hiroi S, Kase T. Seasonal variations of respiratory viruses and etiology of human rhinovirus infection in children. J Clin Virol 2015; 73: 14-19.

3) Meo SA, Abukhalaf AA, Alomar AA, Al-Beeshi IZ, Alhowikan A, Shafi KM, Meo AS, Usmani AM, Akram J. Climate and COVID-19 pandemic: effect of heat and humidity on the incidence and mortality in world's top ten hottest and top ten coldest countries. Eur Rev Med Pharmacol Sci 2020; 24: 8232-8238.

4) Pune Mirror. 2,997 more infected and 67 lose battle to the virus. https://punemirror.indiatimes.com/pune/civic/2997-more-infected-and-67-lose-battle-to-the-virus/articleshow/77512977.cms

5) Government of Maharashtra. COVID-19 Monitoring Dashboard by Public Health Department, Government of Maharashtra. (Available from https://experience.arcgis.com/experience/8167a-61f882a4af4b9098e947dfd589f/, Accessed last on 12th July, 2020).

6) Past weather in Pune, Maharashtra, India. (Available from https://www.timeanddate.com/weather/india/pune/historic?month=5&year=2020, Accessed last on 12th July, 2020).