 doi:10.20944/preprints202007.0203.v1

Dependency of COVID-19 Spread on Temperature in Rajasthan

Mukul Solanki

Student, Saraswati College of Nursing, Udaipur, Rajasthan University of Health and Science, Jaipur, Rajasthan, India.

ABSTRACT

To evaluate the dependency of COVID-19 on the temperature, by analyzing secondary data, considering temperature as the only dependent environmental factor. Taking the mean temperature and number of cases from 02nd March to 26th May 2020. We find out the relationship between the number of cases of COVID-19 and mean temperature in Rajasthan by finding the mean and percentage increase of both, and we evaluate that there is no any effect of temperature on coronavirus disease cases in Rajasthan there may be some other environmental factor and extraneous factors which may affect the number of cases.

INTRODUCTION

COVID-19 (coronavirus disease-19) is an infectious disease which is caused by SARS CoV-2 (severe acute respiratory syndrome Corona virus-2). Coronavirus pandemic is an ongoing pandemic of coronavirus disease 2019. This disease has been reported by the World Health Organization (WHO) on 31st December 2019 in Wuhan, China. The first case in India identifies on 30th January 2020. In Rajasthan it was reported on 2nd March 2020 in Jaipur. It is a highly contagious virus; belongs to the *Coronaviridae* family [(1)] which affects the respiratory system of the human body. It is primarily spread by the direct/indirect contact between the people while coughing, sneezing, and talking produces droplets in the air. These droplets usually fall onto the ground or to the surface where some of them convert into aerosols, which may travel through the air for a long period or people may get infected by touching a contaminated surface [(2)], which may play a major role in transmission of infection in the hospital and the community. The average droplet ranges from 1 to 100 µm [(3)]. Experimental research on related viruses found indeed a decrease in high temperature and humidity [(4)], Another author suggested that some disease spread faster in high humidity levels [(5)] The average incubation period lies from the 1st to 14th median[7.5] day after being contacted. According to WHO common symptoms of coronavirus disease include dry cough, fever or chills, fatigue, shortness of breath other symptoms such as sore throat, congestion, ageusia, myalgia, diarrhea, nausea, vomiting, conjunctivitis, headache and some may progress to ARDS (acute respiratory distress syndrome). The people who get infected fall under three categories. First in the category is the elderly, who are highly susceptible to the virus. Statistics show that because of the weak immune system the elderly pass to the disease easily. The second category is that of the children. As the immune systems of young children are still under development, the children are at higher risk. The third category is that of the people who have diseases like diabetes, high BP, asthma, cancer, cardiovascular disease, etc. As their immune systems have been compromised already due to a prevailing medical condition, these people become easy targets. Infections experienced by the third category of people can be fatal. Various environmental factors affect the transmission of coronavirus disease such as humidity, temperature, and airflow and population density. The ongoing covid-19 pandemic is mainly influenced by temperature and relative humidity [(6)]. But in our study, we observe the effect of temperature on the number of cases of coronavirus disease in Rajasthan. We obtain

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 10 July 2020 doi:10.20944/preprints202007.0203.v1

the data from the department of medical, health and family welfare government of Rajasthan (www.rajswasthya.nic.in) and the daily average temperature of Rajasthan from the meteorological site (www.accuweather.com)

METHOD

In this study, we analyse the secondary data. Taking the total number of cases of COVID-19 disease of Rajasthan state (www.rajswasthya.nic.in) from 02nd March 2020 to 26th March 2020 and taking the mean temperature of Rajasthan from 02nd March 2020 to 26th May 2020 of Rajasthan state (www.accuweather.com). Considering temperature as the only dependent environmental factor. On analysis of the data, we find out the mean of all the number of cases and the mean temperature of Rajasthan from 02 March to 26 May 2020. We are not experts of virology to explain the effect of temperature on coronavirus disease. But most of the studies suggested that high temperature and relative humidity reduce the outbreak of disease [7].

MEAN TEMPRATURE AND NUMBER OF CASES TABLE – (1)

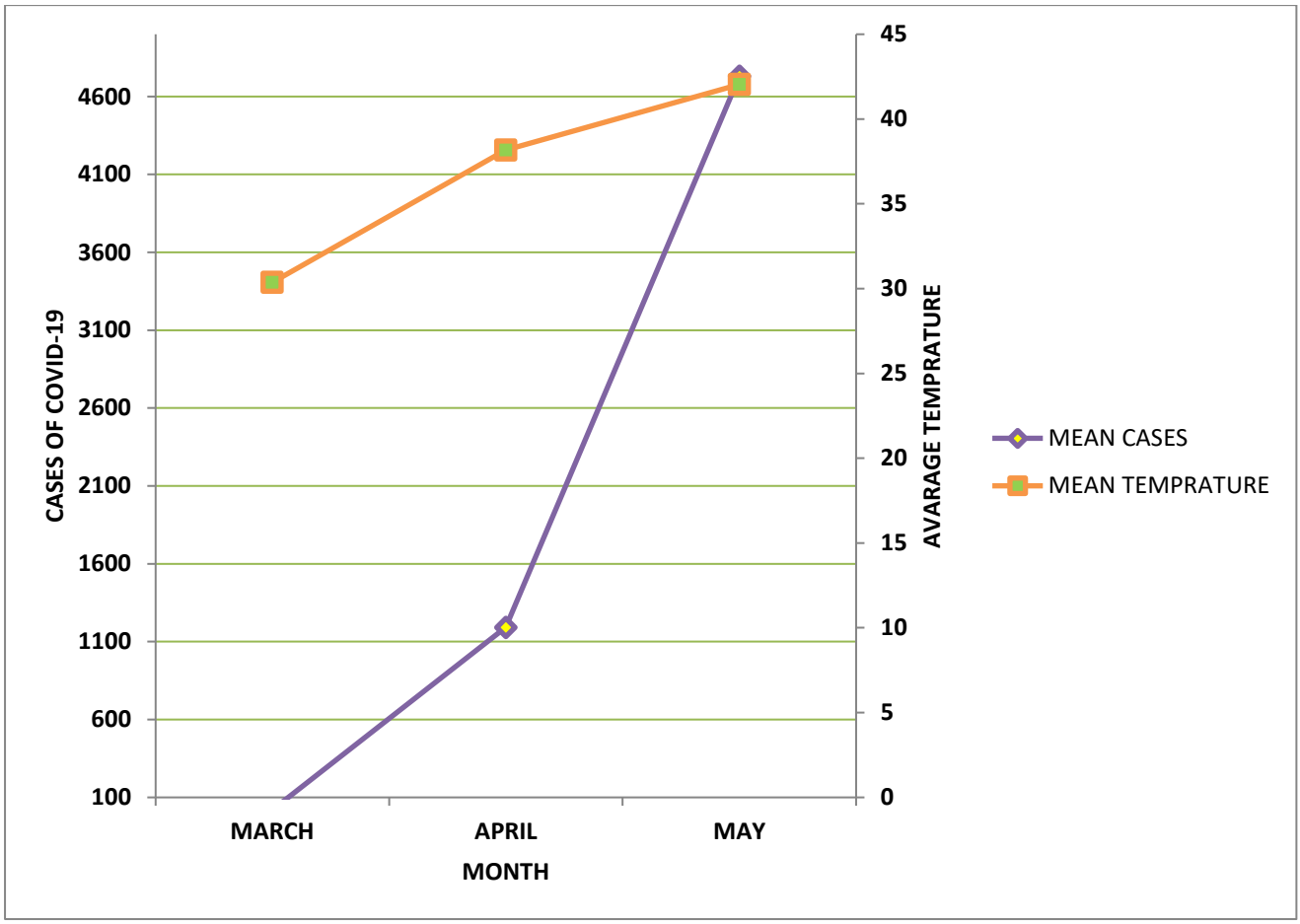
MONTH	MEAN OF CASES	MEAN OF TEMPRATURE
MARCH	20.1	30.37
APRIL	1191.3	38.17
MAY	4729.5	42.04

RESULT

Forecasting the result of the data, we figure out the percentage increases in the number of cases and temperature. From the month March 2020 to May 2020 the percentage increase of the cases is about 4729.5%. But if talk about the temperature from the month March 2020 to May 2020 the percentage increase is about 38.4%. From the above data, we found that there is a rise in the number of cases of coronavirus disease with rise in temperature.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 10 July 2020 doi:10.20944/preprints202007.0203.v1

MEAN TEMPERATURE AND NUMBER OF CASES GRAPH – (1)



DISCUSSION-

In the present study, we observed that there is an inclination of the mean graph curve of both the number of cases and temperature. Temperature doesn't directly affect the number of cases. Significant relationship of negative correlation between the average environmental temperature and exponential growth rates of the infected cases [(8)]. However, some of the limitations should be noted. In this study were being not included humidity, airflow, and other environmental factors, or maybe some other extraneous factors like population density affecting the number of cases. There are various practices use to stop the spread of the disease. A complete lockdown should be imposed. Maintain at least 2 meter personal distance from others. Avoid touching eyes, nose, and mouth frequently through hands. Frequent hand washing should be done. People should wear masks to stop the spread of disease, Drink at least 3 liters of water in a day and eat fresh food. Isolation of sick one should be strictly implemented with contact tracing of people and quarantine them with the finding of past traveling history. The patient should be asked to wear a simple surgical mask and practice of cough hygiene. The caregiver should be asked to wear surgical mask. Caregivers should be asked to wear a surgical mask when in the same room as the patient and use hand hygiene every 15–20 min. Increase awareness and responsibilities among the citizens' use of alcohol-based hand sanitizers. The government also needs to stop rumors about the disease.

REFERENCES-

1- Marco Cascella; Michael Rajnik; Arturo Cuomo; Scott C. Dulebohn; Raffaela Di Napoli. Features, Evaluation and Treatment Coronavirus (COVID-19) Treasure Island (FL): StatPearls Publishing; 2020 Jan.

2- Tang, J.W., Wilson, P., Shetty, N. *et al.* Aerosol-Transmitted Infections—a New Consideration for Public Health and Infection Control Teams. *Curr Treat Options Infect Dis* **7,** 176–201 (2015). https://doi.org/10.1007/s40506-015-0057-1

3- Liu, Y., Li, Y., Hensel, A. *et al.* A review on emulsification via microfluidic processes. *Front. Chem. Sci. Eng.* **14,** 350–364 (2020). https://doi.org/10.1007/s11705-019-1894-0

4- Alessio Notari. Temperature dependence of COVID-19 transmission. ArXiv:2003.12417

5- Wang, Jingyuan and Tang, Ke and Feng, Kai and Lin, Xin and Lv, Weifeng and Chen, Kun and Wang, Fei, High Temperature and High Humidity Reduce the Transmission of COVID-19 (March 9, 2020). Available at SSRN: https://ssrn.com/abstract=3551767

6- Soumyabrata Bhattacharjee. Statistical investigation of relationship between spread of coronavirus disease (COVID19) and environmental factors based on study of four mostly affected places of China and five mostly affected places of Italy. arXiv.org > q-bio > arXiv:2003.11277

7- Ma Y, Zhao Y, Liu J, et al. Effects of temperature variation and humidity on the death of COVID-19 in Wuhan, China. *Sci Total Environ*. 2020;724:138226. doi:10.1016/j.scitotenv.2020.138226

8- Meraj G, Farooq M, Singh SK, Romshoo SA, Nathawat MS, Kanga S. Coronavirus Pandemic vs. Temperature in the context of Indian Subcontinent–A preliminary statistical analysis.