Impact of Covid-19 on Indian Monsoon During (2019-2022): Proposed work

Pushpesh Dutt Tiwari[1], Mayank Pandey[2], Mahesh Dutt Tiwari[3], Shipra[1]

[1]M.Tech Scholar, K. Banerjee Center of Atmospheric and Ocean Studies, University of Allahabad

[2]Ph.D Scholar, M.N. Saha Center of Space Studies & K. Banerjee Center of Atmospheric and Ocean Studies, University of Allahabad

[3]M.Sc Scholar, Centre of Environmental Science, University of Allahabad

Corresponding author: pdtiwari_121@rediffmail.com

Abstract: In this paper here we summarize that the relation between Covid-19 against the Indian monsoon. We address current information about the Indian monsoon in this analysis. The goal of this work is to comparative analysis of covid-19 and Indian monsoon. We also proposed framework for covid-19 and monsoon thermal and dynamic system with their condition. Here we focus the sign convention and their impact of covid-19 & Indian monsoon system. Here we show covid-19 high in the summer season due to various factors. In this paper we have find the nature and comparative analysis of Covid-19 & Indian monsoon system.

Keywords: COVID-19 diseases, novel frame work for COVID-19 for Indian monsoon system.

Introduction: COVID-19 (corona virus disease 2019) is a disease caused by a virus named SARS-CoV-2 and was discovered in December 2019 in Wuhan, China. It is very contagious and has quickly spread around the world [1]. COVID-19 most often causes respiratory symptoms that can feel much like a cold, a flu, or pneumonia. COVID-19 may attack more than your lungs and respiratory system. Other parts of your body may also be affected by the disease.

- Most people with COVID-19 have mild symptoms, but some people become severely ill.
- Some people including those with minor or no symptoms may suffer from post-COVID conditions — or "long COVID".
- Older adults and people who have certain underlying medical conditions are at increased risk of severe illness from COVID-19.
- Hundreds of thousands of people have died from COVID-19 in the Indian States.
- Vaccines against COVID-19 are safe and effective. Vaccines teach our immune system to fight the virus that causes COVID-19.

Corona virus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease,

diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age [2].

The virus can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breathe. These particles range from larger respiratory droplets to smaller aerosols [3].

What is Monsoon: A monsoon is a seasonal change in the direction of the prevailing, or strongest, winds of a region. Monsoon winds are caused when the air over land gets heated and rises, causing winds to blow from the ocean towards lands [4].

Concepts of the origin of Monsoon: The concept of the origin of monsoon is related to thermal and dynamic factors and thus there are two concepts of the origin of monsoon e.g.

(1) Thermal concept and (2) Dynamic concept.

Thermal Concept: The thermal concept of the origin of monsoon was first propounded by halley in 1686 according to this concept the monsoons are the result of heterogeneous character of the globe (unequal distribution of land and water) and differential seasonal heating and cooling of the continental and oceanic areas.

On the other hand, low pressure centers is developed in the southern Indian ocean due to summer season and related high temperature in the southern hemisphere.

Dynamic concept: A host of scientists have refuted the thermal origin of monsoon and have raised the following objections against the old concept or thermal concept

If the 'lows developed over the land areas are 'heat lows' (low pressure centres developed due two high temperature), then they should remain satationary at their places for some time but they are never stationary. There is sudden and widespread sifting in their positions.

Indian Monsoon: The seasonal reversal in the wind direction during a year is called monsoon. Indian climate is a monsoon type of climate. Monsoon climate is characterized by weather conditions that change from season to season. This type is mostty experienced in interior parts of the country rather than coastal areas. As over the plains of India, the climate of the Himalayas is largely seasonal in nature.

Types of Monsoon Seasons are as:

(1) Pre- Monsoon / hot weather season (March- May)
(2) Rainy season / south western monsoon (June- September)
(3) Post monsoon season/ northeast monsoon (October- November)
(4) Winter season (December- February)

Proposed work: This work shows the relation between Covid-19 and Indian monsoon by block diagram as:

.

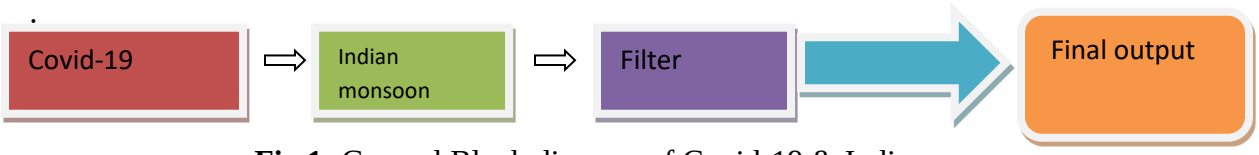

Fig 1: General Block diagram of Covid-19 & Indian monsoon

Objectives: In this paper we are focusing the some theoretical and new work has been done with the point of view of Covid-19 & Indian monsoon as:

- To investigate the nature of the Covid-19 and Indian Monsoon
- To find the comparative analysis of Covid-19 and Indian Monsoon

Material and methods:

(1) **Protocol and registration :** This systematic reviews was not registered with the PROSPERO database (CRD42020176909)

But performed according with the PRISMA (preferred reporting items for systematic reviews and meta- analysis)

(2) **Eligibility criteria:** Manuscripts that evaluated the effects of different climatic conditions of temperature and/or humidity on the spread of covid-19 were included. The search strategy was defined based on the PECOS format as follows:

Population (P): Humans diagnosed with COVID-19, Exposition (E): Different weather conditions: Humidity, temperature, Comparison(C): Without comparison: Outcome (O): Spread of SARS-CoV-2 (covid-19); Study design (S): Observational studies, prospective or retrospective, case reports, case series [5].

The exclusion criteria involved studies that evaluated other upper and lower respiratory syndrome coronavirous (MERS-CoV), and influenza. The assessment of other climatic conditions, except for temperature and humidity was also not considered. Opinion articles, animal or laboratory studies, and literature reviews were not included.

(3) **Information sources:**

The following electronic databases were searched: PubMed, Scopus, Web of science, Cochrane library, LILAC, OpenGrey and Google scholar. A hand search was also conducted by reading the references list of the included articles. The search was conducted up to March 24th, 2019 in all databases, and until 31st September, 2022 only in Google scholar.

Comparative Analysis:

Parameters	Covid-19	Parameters	Indian Monsoon	Remarks
Symptoms	Fever, cough,fatigue,shortness of breath	**Air temperature**	decreases	Correlated
Topology	Network topology	**Air pollution**	decreases	Not correlated
Size	It has round or elliptic and often pleomorphic form, and a diameter of approximately 60-40 nm	**Air quality**	Clean and safe	Correlated
Incubation period	Average 5-6 days, but can be as long as 14 days	**Water quality**	Clean and pure	Correlated
Nature	Spiky/crowns	**Humidity**	The doubling time correlates positively with temperature and inversaly with humidity	Correlated
Range	Large	**Precipitation**	Precipitation is significantly associated with a decreases risk of covid -19	Correlated
RT-PCR Test	Delete accurate result	**Soil pollution**	Soil is highly polluted	Correlated
Origin of the Virus	Bats	**Environmental issue**	Environment are also polluted	Correlated

Table 1**:** Comparative analysis of Covid-19 & Indian monsoon with different parameters

Background: Faced with the global pandemic of covid-19, declared by world health organization (who) on march 11th 2020, and the need to better understand the seasonal behavior of the virus, our team conducted this systematic review to describe current knowledge about the emergency and replicability of the virus and its connection with different weather factors such as temperature and relative humidity etc.

Results: The initial screening identified various articles. Great homogeneity was observed in the findings regarding the effect of temperature and humidity on the seasonal viability and transmissibility of covid -19. Cold and dry conditions were potentiating factors on the spread of the virus. After quality assessment of the water and air quality is clean and pure and air temperature and air pollution decreases continuously in Covid-19 time. According to our comparative analysis and we have used here GrADS software for the analysis of Covid-19 and Indian Monsoon according to various parameters and sign convention rule of table 2. We can say that the covid-19

was high in the summer season due to various factors like different parameters used in this analysis

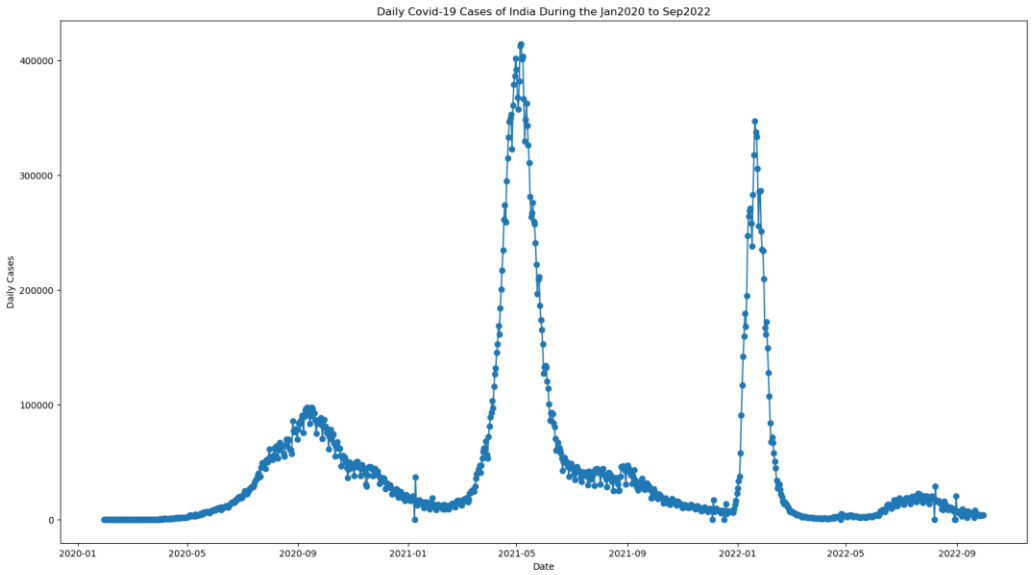

Fig. 2: Daily Covid-19 case of India during the Jan 2020 to Sept 2022

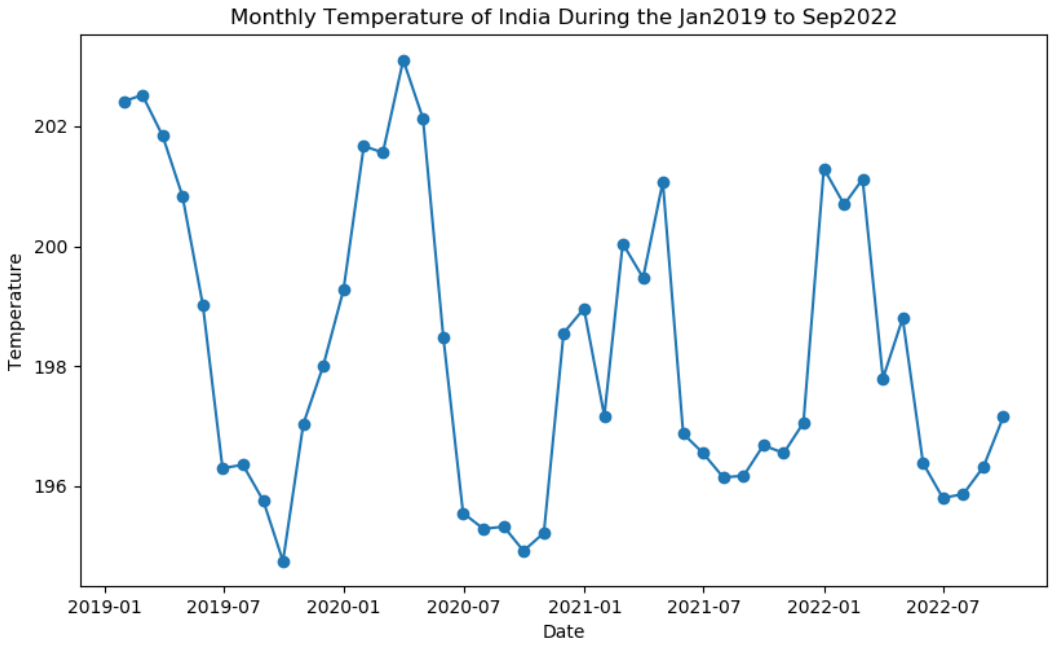

Fig. 3: Monthly temperature of India during the Jan 2019 to Sept 2022

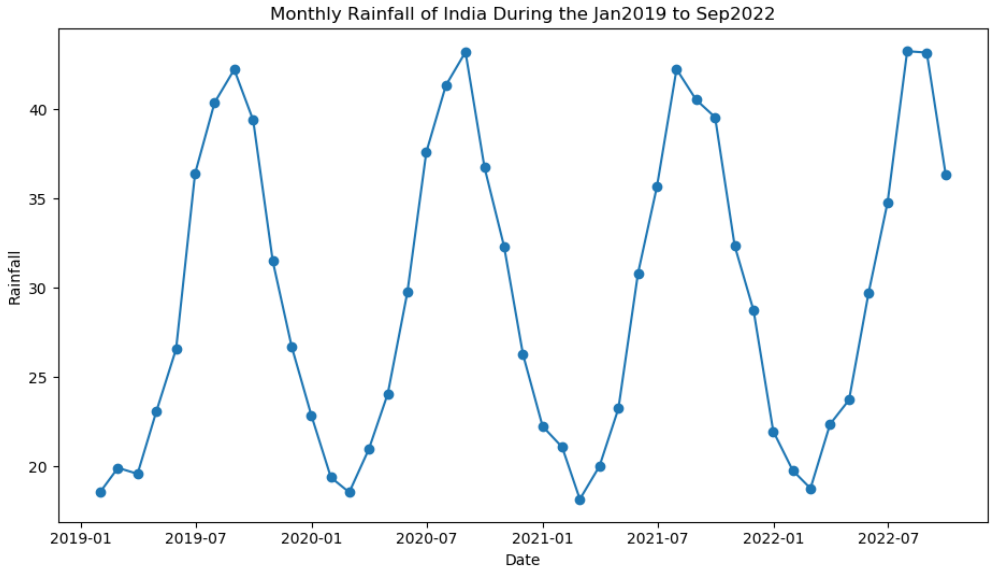

Fig. 4: Monthly Rainfall of India during the Jan 2019 to Sept 2022

Discussion: The results of the articles included in this systematic review indicate that the spread of COVID-19 may be influenced by Indian monsoon variables such as temperature and humidity. Furthermore, the spread of types of diseases caused by betacoronavirus, such as SARS-CoV-1 [6] and MERS-CoV [7], have already been shown to suffer the impact of climate condition both those the analyses of COVID-19 outbreaks in relation to meteorology aspects reveal significant connection between the incidence of positive cases and climate conditions. Social factors play a role in coronavirous outbreaks, since this public health problem is too complex to be explained solely in relation of climatic conditions. Isolation programs, social distancinh, number of inhabitants per household, immigration control program, personal, hygiene conditions are some of the confounding variable that must interfere in the spread of the new coronavirus, as it occurs with another coronaviruses in the past [8,9].

Impact of Covid-19 & Indian monsoon through Parameters with sign convention:

Parameters	**Covid-19**	**Parameters**	**Indian monsoon**
Symptoms	+	Air temperature	-
Topology	nill	Air pollution	+
Size	+	Air quality	+
Incubation period	+	Water quality	+
Nature	+	Humidity	+
Range	nill	Precipitation	+
RT-PCR Test	+	Soil pollution	+
Origin of the Virus	+	Environmental issue	+

Table 2**:** Impact of Covid-19 & Indian monsoon with their parameters & sign convention

Limitations: Lack of studies to use their different models to estimate the expected number of infected cases and mortalities by using different policies. In the current study, reputable databases were searched; however, eventually some of the articles found in the three main databases were removed from the study, and the included studies selected were more from Google Scholar. Furthermore, given that a short time has passed since the outbreak of corona virus, it is required to conduct a systematic review with more studies in future.

Conclusion: Here we concluded that vaccinations can drastically reduce our risk of becoming ill with some infectious diseases. If we can avoid a particular disease, then we can also prevent the spread of the disease. Covid-19 is sufficient indication for testing for what appears to be a milder case not requiring hospitalization. They will base this on the local outbreak situations, and evaluations of those with sever respiratory illness of unclear origin. At present there is no specific antiviral treatment of covid-19.

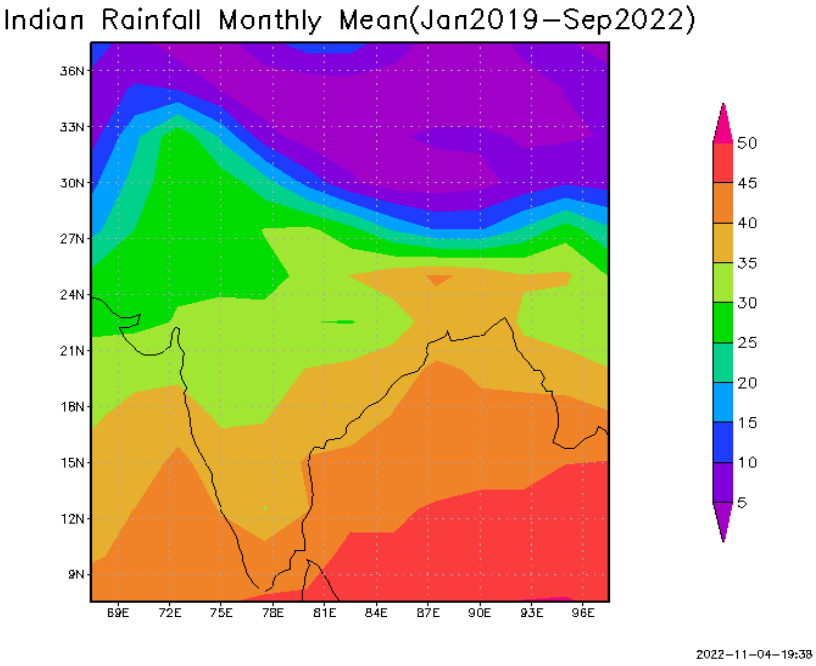

Fig. 5: Indian Rainfall monthly means (Jan 2019 – Sep 2022)

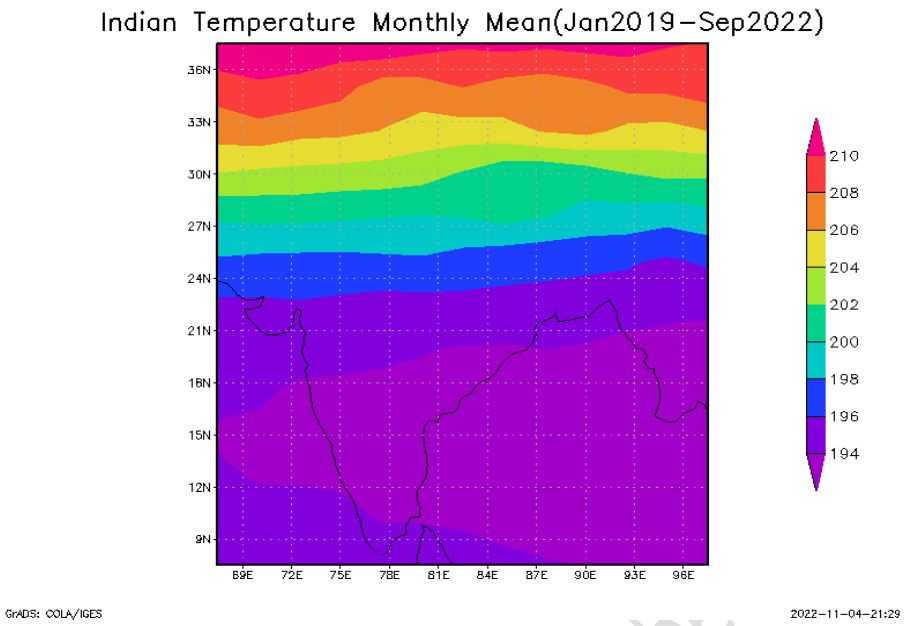

Fig.6: Indian temperature monthly mean (Jan 2019- Sep 2022)

Considering the existing scientific evidence, warm and wet climates seem to reduce the spread of covid-19 however these, variables alone could not explain most of the variability in diseases transmission. Therefore, the countries most affected by the disease should focus on health policies, even with climates less favourable to the virus. Although the certainity of the evidence generated was classified as low, there was homogeneity between the result reported by the include studies. Based on a low level of evidence, the spread of covid-19 seems to be lower in warm and wet climates. Furthermore, temperature and humidity alone do not explain most of the variability of the COVID-19 outbreak. Public isolation policies, herd immunity, migration patterns, population density, and cultural aspects might directly influence how the spread of this disease occurs. Thus weather condition associated with the health policies is knowledge of great value for the benefit of the humanity in this critical period. The present study sought to determine the relationship between climatic variables with the survival and spread of the new corona virus. Therefore, the published and related articles were systematically reviewed, and after reviewing the articles resulting from searching the scientific databases, a few articles were obtained. These articles aimed to find a precise link between the virus and climatic variables, but failed to report a specific temperature or humidity to stop the virus from spreading and transmitting the virus. Given the short time that has passed since the outbreak of the corona virus worldwide, it is required to conduct more studies in this regard to introduce the exact pattern of transmission by examining the conditions of virus transmission in different climatic conditions. Here we have also find the nature of Covid-19 that is spiky (see Fig. 2) nature and overall analysis was too complex and system is also static & dynamic with the deep behavior of Indian monsoon system.

Acknowledgements: The authors are very grateful to Mr. Arunesh Dutt and Dr.Vivek Kumar Pandey for providing ideas, encouragement for carrying out this work.

Contributors: All authors contributed to the data collection, data analysis, and manuscript writing, critically reviewed the draft, and approved it for publication.

Data sharing: It will be made available to others as required upon requesting the corresponding author.

Conflicts of interest: We declare that we have no conflicts of interest.

Funding Source: None.

References

1. National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases.

2. Human Coronavirus. In Types Centers for Disease Control and Prevention. 2020 [cited 2020 March 24]. Available from: https://www.cdc.gov/coronavirus/types.html
3. Wu F, Zhao S, Yu B, et al. A new coronavirus associated with human respiratory disease in China. Nature. 2020;579: 265–9. 10.1038/s41586-020-2008-3 - DOI - PMC - PubMed
4. www.national geographic.org
5. Heydari A, FallahAliabadi S, Habibi P. Effect of Ambient Temperature on the Spread of COVID-19: A Systematic Review. J Community Health Research 2021; 10(3): 270-280.
6. Chan KH, Peiris JS, Lam SY, Poon LL, Yuen KY, Seto WH. The effects of temperature and relative humidity on the viability of the SARS coronavirus. Adv Virol. 2011;2011: 734690 10.1155/2011/734690.
7. Altamimi A, Ahmed AE. Climate factors and incidence of Middle East Respiratory Syndrome coronavirus. J Infect Public Health. 2020;13: 704–708. 10.1016/j.jiph.2019.11.011.
8. Yip C, Chang WL, Yeung KH, Yu IT. Possible meteorological influence on the severe acute respiratory syndrome (SARS) community outbreak at Amoy Gardens, Hong Kong. J Environ Health. 2007;70: 39–46.
9. Yuan J, Yun H, Lan W, et al. A climatologic investigation of the SARS-CoV outbreak in Beijing, China. Am J Infect Control. 2006;34: 234–6. 10.1016/j.ajic.2005.12.006 - DOI - PMC - PubMed.