

Indian Governance on Sars-Cov2 Viral Outbreak – A Chronology

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Abstract: - The world is now facing an unprecedented crisis due to the novel coronavirus. The disease has spread around 210 countries and territories around the globe and infected (confirmed) more than twelve million people (09/07/2020). The global death rate due to coronavirus was around 584k, respectively. This intense situation emerges the necessity of drug discovery and vaccination against SARS-COV2. The total (cumulative) number of confirmed infected people is 767K until now across India (09 JUL 2020). Most of the research and newspaper articles focus on the number of infected people over the countries. In the absence of a vaccine, the preventive measures of maintaining basic personal hygiene and large-scale social distancing appears to be most effective against SARS-COV2 causing infection. The effect of preventing actions and lockdown was observed that the count was in control during the lockdown period. Complete unlocking protocols may elevate the possibility of viral spread. A sustained lockdown with considerable relaxation is suggested. This article discusses the timeline events and guidance of Indian governance on this pandemic 2020. Additionally, it also covers the graphical growth curvature of Morbidity and Mortality rate, centre's accomplishments, economical inspection, and exponential growth.

Key Words: — SARS-COV2, Janata curfew, Growth factor, ICMR, BBV 152

I. INTRODUCTION

The family Coronaviridae comprises a group of large, single, plus-stranded RNA viruses isolated from several species. It is previously known to cause the common cold and diarrheal illnesses in humans. Recently, a new coronavirus (2019-nCoV) has emerged in the region of Wuhan (China) as a cause of severe respiratory infection in humans. The novel coronavirus originated from bats, and the spike glycoprotein's evolutionary changes provide the transmission chain to the Homo Sapiens. The infected host will develop acute throat soreness, dry cough, and fever. Severe symptoms are shortness of breathing, chest angina, loss of movement. Many countries involved in the race of drug discovery for SARS-COV2. Experts expressed concern about the spread of COVID-19 and its potential to cause more than 1.7 billion infections and 7.6 million deaths in South Asia alone if no actions were taken. India, the world's second-most populous country and the largest in South Asia with a population of nearly 1.4 billion, is at risk of having a high share of these infections. Indian government regulates this viral outbreak by implementing lockdown, awareness, social distancing, financial support, quarantine the infected people, and hospitalization. Despite the government's efforts to contain the disease in the affected districts only, it has so far hit 558 out of 640 districts.

The consequences so far reached is not only due to population but also because of other reasons, including challenges in practicing social distancing, non-universal access to water, soap, and sanitizer. Physicians and nursing staffs working in the COVID-19 ward also suffer due to inadequate Personal Protective Equipment (PPE). The vital aspect of the epidemic that affects a community spread of the disease is the number of asymptomatic cases in the population. As per Government of India data more than 80% of confirmed cases in India are asymptomatic, making the population vulnerable to community spread of the virus. Coronavirus outbreak is a situation that could not be foreseen. Although Medicare (medical facilities and health policies) in India is gaining its momentum, and health care has become at par with technologies, the country is facing a hard time in battling COVID-19. The government developed 'Aarogya Setu,' a mobile application to connect essential health service. This app helps to reach out and use information regarding COVID-19 risks, best practices, and advisories. This paper attempts to explain the concept of analysis in the management of the epidemic in India.

II. LITERATURE SURVEY

Indian governance on SARS-COV2 viral outbreak– Timeline:

30 January 2020 - India confirms its first coronavirus case. (reid, 2020):

The Ministry of Health and Family Welfare said the country's first case was a patient in Kerala, a southwestern coastal state. The Ministry said in the statement that the patient is a student at Wuhan University in China and has been isolated in a hospital.

02 February 2020 - India temporarily suspends the e-visa facility for Chinese and foreigners residing in China. (The Times Of India, 2020)

India temporarily suspended e-visa facility for Chinese travellers and foreigners residing in China in the view of virulent novel coronavirus that has killed more than 300 people, infected 14562 others and spread to 25 countries including India, U.S and U.K.

03 February 2020 - Kerala's third coronavirus case confirmed in Kasaragod. (Smitha N, 2020)

India's third case of coronavirus has been reported on February 3, 2020 from Kerala, again. Two Wuhan University students who returned recently from China are said to be infected with the novel coronavirus and are treated at government medical college hospitals. The medical student, a batchmate of the two infected students, has tested positive for the viral infection, said health minister K.K Shylaja in the State Assembly.

18 February 2020 - Indian industries steps to deal with impact of COVID-19 soon, says Nirmala Sitharaman (The Hindu, 2020)

Ms. Sitharaman downplayed fears of any immediate price rise of medicines or other products, saying there were no reports of immediate shortages. However, official sources present at the meeting said most sectors have three to four weeks of raw materials available, adding that the longer-term impact is still uncertain.

11 March 2020 – World Health Organisation declares COVID-19 a Pandemic (Cucinotta D, 2020)

On March 11, 2020, the World Health Organisation (WHO) declared the novel coronavirus (COVID-19) outbreak a global pandemic. WHO Director-General, Dr. Tedros Adhanom Ghebreyesus, noted that WHO is deeply concerned by the alarming levels of spread and severity, and by the alarming levels of inaction. He also added that 'pandemic' is not a word

to be used lightly or carelessly. If misused, it can cause unreasonable fear or unjustified acceptance that the fight is over, leading to unnecessary suffering and death.

12 March 2020 – Karnataka announces India's first coronavirus death (The Economic Times, 2020)

A 76-year-old man who died had tested positive for the novel coronavirus, an Indian state health minister reported on Thursday, 12th March, 2020, marking the country's first fatality from the global pandemic.

13 March 2020 – The Punjab, Chhattisgarh and Manipur governments declared schools and colleges closed until March 31

The Punjab and Chhattisgarh governments declared all schools and colleges closed till March 31. Manipur government announced that all schools in the state, where examination are not being held would remain closed till March 31.

17 March 2020 - India still in Stage 2, says Indian Council of Medical Research (ICMR) (Times Now News, 2020)

India continues to be in stage-2 and not stage-3 of coronavirus pandemic, the ICMR said on Tuesday, 17 March, 2020. Dr Balram Bhargava, director general of ICMR said that 72 laboratories are currently testing the virus in the country, while 49 others will be added by end of this week. However, he added that it would be too early to say that we have contained the virus.

22 March 2020 - Modi announces 'Janata Curfew', urges for resolve, and restraint to fight coronavirus (Chandna, Himani., Basu, Mohana, 2020)

The prime minister, in a televised address to the nation, announced a 'Janata Curfew' from 7 am to 9 pm on Sunday, 22 March, to stop the spread of coronavirus that has already claimed four lives in the country and infected at least 169 others. "Under the 'Janata Curfew' no one will go out of their houses. It will also prepare us for the forthcoming days," said PM Modi, hinting that such isolation drives could be essential in future to stop the spread of COVID19.

24 March 2020 – Prime Minister Modi announces 21-day lockdown as COVID-19 toll reaches 12 (Hebbar, 2020)

As the death toll from COVID-19 rose to 12, Prime Minister Narendra Modi announced a 21-day lockdown for the entire

country, stating that it was the only way to break the chain of infection. He added that the lockdown will be in effect till April 14.

30 March 2020 – Health Ministry declares no community transmission yet (Ghosh, 2020)

Even as the number of coronavirus cases in India crossed 1,250, the Health Ministry on Monday reiterated that COVID-19 is still in the local transmission stage in India and that there has been “no community transmission yet”. “If there will be a community transmission, we will convey it to the community through mass media to increase the level of alertness and management for COVID-19 at the field level,” said Lav Agarwal, Joint Secretary in the Health Ministry.

03 April 2020 - ICMR recommends antibody test for speedy detection of COVID-19 cases (The Hindu, 2020)

The Indian Council of Medical Research (ICMR) in its interim advisory has recommended the use of the rapid antibody test in the country’s coronavirus hotspots. The decision for the recommendation was taken at an emergency meeting of the National Task Force, formed to deal with the health crisis.

05 April 2020 - India stands against COVID-19: Prez Kovind, Narendra Modi, Amit Shah, Rajnath Singh ignite ‘diyas’ of hope (Kapoor, 2020)

As India lit up to mark Prime Minister's appeal of lighting candles, diyas and flashlights at 9 pm for nine minutes, several prominent political leaders joined the nationwide exercise by switching off the lights at their residences. President Ram Nath Kovind also participated in this national exercise. President Kovind showed the collective solidarity and positivity of all the countrymen by lighting a candle at 9 pm along with his first lady and other family members.

14 April 2020 – Prime Minister Narendra Modi extended the lockdown till May 3, 2020 (Prabhu, 2020)

Prime Minister Narendra Modi has extended the lockdown till May 3 to control the spread of coronavirus in India and said the restrictions could be reviewed for the least affected parts of the country on April 20. “Till April 20, each district, each state will be monitored closely to see whether the lockdown is being followed. Then we can decide on relaxing the restrictions,” said the Prime Minister.

28 April 2020 - No more use of rapid test kits; ICMR issues advisory to States and UT’s (Financial Express, 2020)

Indian Council of Medical Research in its advisory recommended to stop the usage of rapid test kits in India, an advisory issued by ICMR to Chief Secretaries of all States and UTs advocates that RT-PCR throat/nasal swab test is the best use for COVID-19 diagnosis.

01 May 2020 – Ministry of Home Affairs permitted special trains for the stranded (Jain, 2020)

The Home Ministry allowed the movement of migrant workers as well as stranded students, pilgrims, tourist and others by ‘special shramik’ trains, with due adherence to social distancing norms at railway station, platforms and inside the trains.

02 May 2020 - India extends limited lockdown till May 17 (India Today, 2020)

The Ministry of Home Affairs extended the lockdown for two weeks while allowing different sets of relaxations in red, orange and green zones. The new guidelines aim at allowing India to exit from lockdown in a staggered manner while reopening the economy.

07 May 2020 - ICMR partners with India Post for delivery of COVID-19 testing kits (The Economic Times, 2020)

The Indian Council of Medical Research (ICMR) has joined hands with the India Post for the delivery of COVID kits from its 16 regional depots to 200 additional labs designated for coronavirus tests across the country, reported ANI. “While continuing to deliver money to the doorsteps through Aadhaar enabled payment system, the India Post has entered into a tie-up with ICMR on April 20 this year for the delivery of its COVID kits from its 16 regional depots to the 200 additional laboratories designated for COVID testing across the length and breadth of the country,” said an official statement.

17 May 2020 - Nationwide lockdown extended till May 31, with considerable relaxations (The Economic Times, 2020)

The centre extended the nationwide lockdown till May 31. The fourth phase of the lockdown was commenced on 17th May 2020. The government has allowed considerable relaxations in this round of lockdown. Inter-state movement of vehicles, buses have been allowed with states and Union Territories given the final power to delineate Red, Orange and Green zones.

27 May 2020 - ICMR has approved 624 laboratories across India to conduct COVID-19 tests (Fresherslive, 2020)

ICMR was continuously scaling up its testing facilities for the COVID-19 by approving government and private laboratories. So far, ICMR has approved a total of 624 laboratories across India to conduct the tests for COVID-19 including 435 government laboratories and 189 private laboratories.

31 May 2020 - India's recovery rate improved to 47.76% (Times Of India, 2020)

The recovery rate of coronavirus patients has increased to 47.76 percent, said the Union Ministry of Health and Family Welfare. "In the last 24 hours, 4,614 patients were cured. A cumulative total of 86,983 people has been cured. This takes the total recovery rate to 47.76 per cent," read an official statement issued by the ministry.

14 June 2020- Remdesivir, Tocilizumab and CPT included in revised protocols for COVID-19 clinical management (EP News Bureau, 2020)

ICMR has revised the protocol for clinical management of COVID-19. It has allowed the use of Remdesivir, Tocilizumab and Convalescent Plasma Therapy (CPT) on certain groups of patients. The document says, "Remdesivir" may be considered in patients with moderate disease (those on oxygen), Tocilizumab (Off Label) may be considered in patients with moderate disease

with progressively increasing oxygen requirements and in mechanically ventilated patients not improving despite the use of steroids. Long term safety data in COVID-19 remains largely unknown. Convalescent plasma (Off Label) may be considered in patients with moderate disease who are not improving (oxygen requirement is progressively increasing) despite the use of steroids."

19 June 2020 - Over 7,000 tests using rapid antigen methodology conducted on first day in Delhi: ICMR (The Hindu, 2020)

In a statement, the ICMR said it has facilitated and approved rapid-antigen test for COVID-19 that gives results in 30 minutes in order to fast track reliable and affordable testing essentially in high containment areas. Rapid antigen testing was launched in Delhi and on the first day, over 7,000 tests were conducted, it said.

25 June 2020 - Over 1.63 lakh stranded Jammu & Kashmir residents evacuated from rest of India (The Hindu, 2020)

Over 1.63 lakh residents of Jammu and Kashmir stranded in various places across India due to the coronavirus lockdown have been evacuated, officials said. The administration has evacuated about 1,63,217 Jammu and Kashmir residents, stranded in other parts of the country due to the COVID-19 lockdown, through special trains and buses till date amid strict observance of all necessary guidelines and standard operating procedures, they said.

30 June 2020 - First COVID-19 vaccine clinical trial approved in India (European Pharmaceutical Review, 2020)

India's first potential COVID-19 vaccine has been given approval for phase I and phase II clinical trials. Named Covaxin, the vaccine was developed by Bharat Biotech and has been granted approval from the Drugs Controller General of India (DCGI). Human clinical trials are scheduled to start across India in July 2020. Bharat Biotech created Covaxin in collaboration with the Indian Council of Medical Research (ICMR) and National Institute of Virology (NIV). According to the company, the SARS-CoV-2 strain was isolated in NIV, Pune and transferred to Bharat Biotech.

02 July 2020 - RMRC lab, Assam becomes 4th to isolate COVID-19 virus strain in India (Fresherslive, 2020)

Regional Medical Research Centre (RMRC) located in Lahowal in Dibrugarh district of Assam has successfully isolated the SARS-CoV-2 virus strain becoming the fourth such facility in the country to achieve the feat. Scientists at RMRC stated that all strains of SARS-CoV-2 were L-type and not S-type, which is slowly disappearing across the world.

05 July 2020 - Government says COVID-19 vaccine unlikely before 2021 after ICMR's August 15 launch deadline, backtracks later (India Tv, 2020)

The Ministry of Science and Technology clarified that none of the coronavirus vaccine candidates, including India's Covaxin and ZyCov-D, are likely to be ready for public use before 2021. "Six Indian companies are working on a COVID-19 vaccine. Along with two Indian vaccines, Covaxin and ZyCov-D, world over 11 out of 140 vaccine candidates are in human trials. None of these are likely to be ready for mass use before 2021," the Ministry of Science and Technology said in a statement.

07 July 2020 - Human trial process starts at Hyderabad's NIMS (Live Mint, 2020)

The much-awaited trial process of India's first possible vaccine against COVID-19, Covaxin, has started at the Nizam's Institute of Medical Sciences (NIMS). Developed by Bharat Biotech, the Covaxin will be tested on over 1,100 people in two phases. The company had a plan to enrol 375 participants to test COVID-19 vaccine this month.

09 July 2020 - Active Covid-19 cases down to 25% in Delhi (Times Of India, 2020)

Delhi recorded 2,033 new cases of Covid-19, taking the total count in the state to 1,04,864. The number of fatalities in the past 24 hours was reported to be 48. With this, the state's death toll has reached 3,213. As many as 78,199 (75%) of total Covid-19 patients reported till date have recovered from the disease, the latest data shared by Delhi government showed. This includes 3,982 Covid-19 patients who recovered in the past 24 hours.

III. MORBIDITY AND MORTALITY RATE IN INDIA

Both Morbidity and Mortality rate from COVID-19 infection have significant differences across age-groups, infants and elderly people get easily affected and mortality increasing rapidly with elderly. The morbidity and mortality count collected from the Ministry of Health and Family Welfare (MOHFW). This research based on secondary sources of data and information from various domains to analyse. The following graphical data represents a cumulative number of SARS-COV2 infected individuals from January 2020 to July 2020.

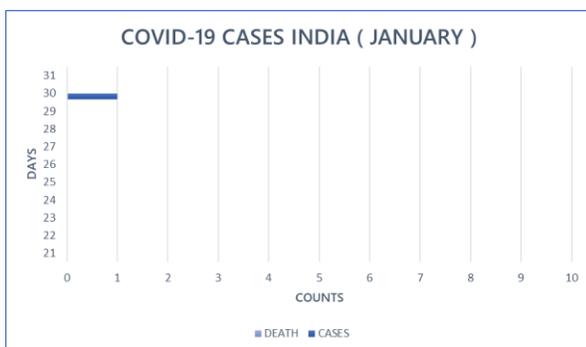


Fig.1.1. The Graphical Representation of total number of COVID-19 infected cases and death in last 11 days of January 2020.

On 30th January 2020, the first COVID-19 case of India was reported in Kerala, among a group of students who arrived in the southern state of Kerala from Wuhan, the epicentre of the outbreak at that time. (Figure 1.1)

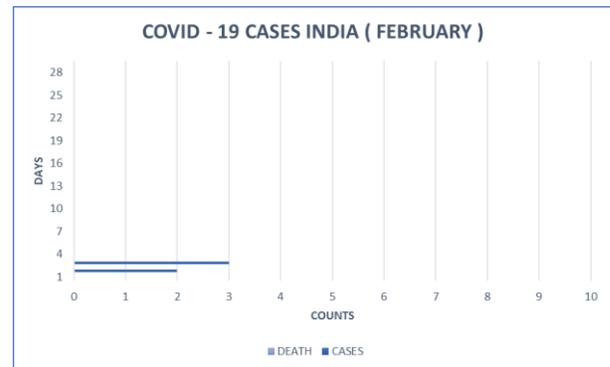


Fig.1.2. The Graphical Representation of total number of COVID-19 infected cases and death in February 2020

In the month of February 2020, Total cumulative of 3 patients were infected (Figure 1.2). Those three patients from Kerala have successfully recovered from the infection as on Friday, February 14, 2020.

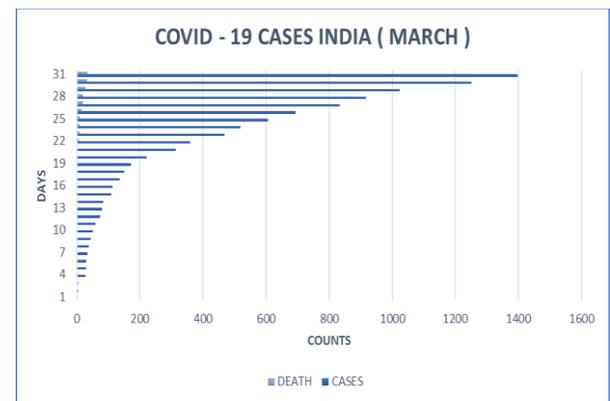


Fig.1.3. The Graphical Representation of total number of COVID-19 infected cases and death in March 2020

As on March 2020, Total number of 50 patients infected (confirmed) and zero death were found till march 10. The cumulative count of 223 cases and 4 deaths in the 2nd tenth of march. In the very end of march, the number was increased to 1,397 cases and 35 deaths. (Figure 1.3)

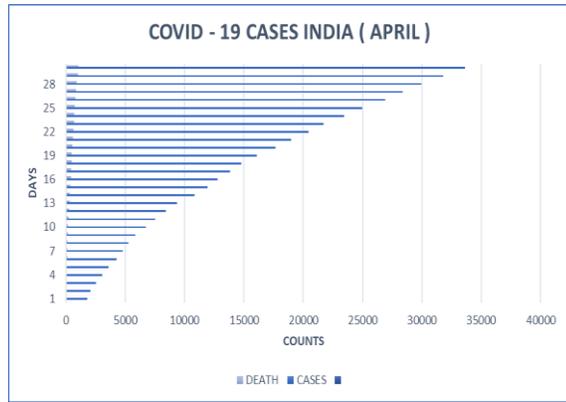


Fig.1.4. The Graphical Representation of total number of COVID-19 infected cases and death in April 2020

The first tenth of April reported 6,761 cases and 206 death (confirmed). Even on 13 April, the affected cases are 904 on that particular day. The total cumulative number rose to 17,656 cases and 559 deaths on 20th March. In the very end of April, increased number of 33,610 cases and 1,075 deaths were reported. (Figure 1.4)

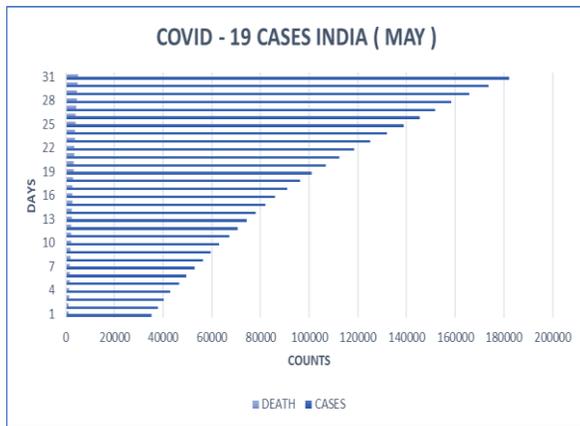


Fig.1.5. The Graphical Representation of total number of COVID-19 infected cases and death in May 2020

The number of 62,939 cases and 2,109 deaths were reported on May 10th. In 2nd tenth of May, infected rate was consecutively increased to 106,750 and 3,303 deaths in number. In the very end of May, the cases were rose to 182,143 and 5,164 deaths. (Figure 1.5)

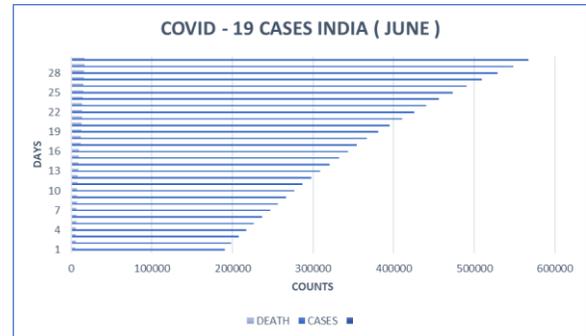


Fig.1.6. The Graphical Representation of total number of COVID-19 infected cases and death in June 2020

The total cumulative of cases and death on 10th June was increased to 276,583 and 7,745, respectively. In the second tenth of month, the count was found to be 395,048 and 12,948. In the very end of the month, the cases and death count rose to 566,840 and 16,893. (Figure 1.6)

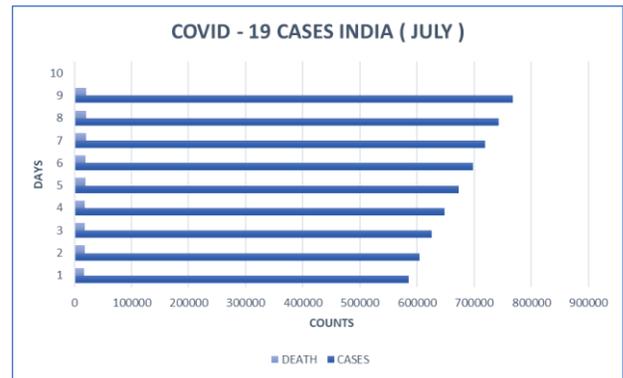


Fig.1.7. The Graphical Representation of total number of COVID-19 infected cases and death in July 2020

The case and death counts increased tremendously and reached the peak of 767,296 and 21,129 on 9th July 2020. It is necessary to consider that the intensity of this viral infection wasn't ended on last date mentioned. (Figure 1.7)

IV. EXPONENTIAL GROWTH ANALYSIS

In Figure (2.1), the morbidity rate curve increased peak in number after the implementation of unlocking protocols, was observed. The growth rate was controlled in number during lockdown period.

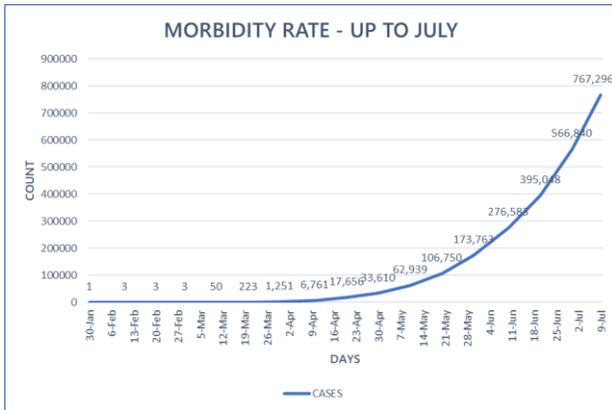


Fig.2.1. The Graphical Representation of Morbidity rate due to COVID-19 infection, up to July 2020

This pattern indicates that the COVID-19 situation went to peak in last 2 months after unlocking Green and Orange zone. For the population of 1379 million in India, the rate of affected people is 0.05% (767,296 confirmed cases). Reason for increasing the cases in India could be because of the ineffective lockdown (only first two lockdowns were effective), inadequate social distancing, lesser number of sample test and relaxing the lockdown policy for various industries which is indirectly leading to the spread. Once the spread is increased in India, it becomes a challenge as we have more cases in population dense cities. Mumbai, Delhi and Chennai are the cities affected badly by COVID-19, and the population density of those cities are pretty high. The mortality rate increase in an exponential manner as number reached 21k, so far. (Figure 2.2)

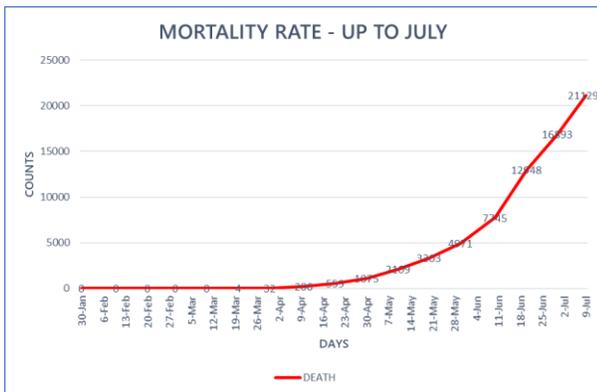


Fig.2.2. The Graphical Representation of Mortality rate due to COVID-19 infection, up to July 2020

This Exponential growth analysis is based on simple algebraic expression:

$$Y = abx$$

Where,

Y = Exponential function

a = Initial value (in number)

b = Average growth factor

x = Expected time period (in number)

Initial count (a) = 767,296 (09/07/2020)

Growth factor (b) = 1.035

Expected period (x) = 60 days

$$Y = 767,296 * 1.03560$$

$$= 767,296 * 7.878$$

Exponential growth (Y) = 60,44,827

From the (Table 1), we figured out that the growth factor was not exceed above 1.040. The average growth factor was calculated on the basis past 21 day's case count. Exponential rate for next 60 days from 09/07/2020 to 07/09/2020 was predicted to be 60,44,827 in number. (Figure 2.3)

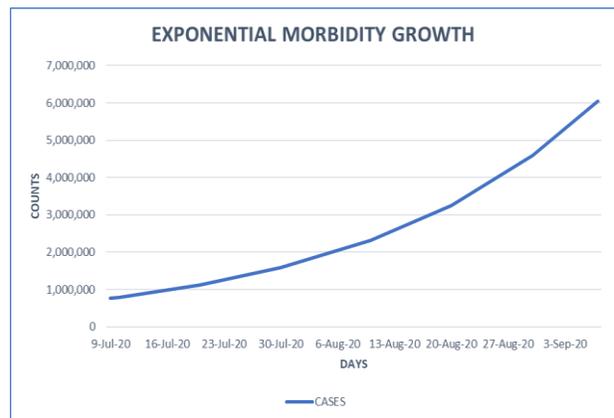


Figure 2.3 The Graphical Representation of Exponential Morbidity growth due to COVID-19 infection for next 60 days (9 Jul-7 Sep 2020)

S. No	Period	Value (Initial)	Value (Final)	Growth Factor
1.	18/06/2020 - 19/06/2020	366946	380532	1.037
2.	19/06/2020 - 20/06/2020	380532	395048	1.038
3.	20/06/2020 - 21/06/2020	395048	410461	1.039
4.	21/06/2020 - 22/06/2020	410461	425282	1.036
5.	22/06/2020 - 23/06/2020	425282	440215	1.035
6.	23/06/2020 - 24/06/2020	440215	456183	1.036
7.	24/06/2020 - 25/06/2020	456183	473105	1.037
8.	25/06/2020 - 26/06/2020	473105	490401	1.036
9.	26/06/2020 - 27/06/2020	490401	508953	1.037
10.	27/06/2020 - 28/06/2020	508953	528859	1.039
11.	28/06/2020 - 29/06/2020	528859	548318	1.036
12.	29/06/2020 - 30/06/2020	548318	566840	1.033
13.	30/06/2020 - 01/07/2020	566840	585493	1.032
14.	01/07/2020 - 02/07/2020	585493	604641	1.032
15.	02/07/2020 - 03/07/2020	604641	625544	1.034
16.	03/07/2020 - 04/07/2020	625544	648315	1.039
17.	04/07/2020 - 05/07/2020	648315	673165	1.038
18.	05/07/2020 - 06/07/2020	673165	697413	1.036
19.	06/07/2020 - 07/07/2020	697413	719665	1.031
20.	07/07/2020 - 08/07/2020	719665	742417	1.031
21.	08/07/2020 - 09/07/2020	742417	767296	1.033
		Average		1.035
		=		

Table.1. - Growth factor value

V. CONCLUSION

In India up to 53% of businesses have specified a certain degree of impact of shutdowns caused due to COVID-19 on operations, as per a FICCI survey in March. By 24 April the unemployment rate had increased nearly 19% within a month, reaching 26% unemployment across India, according to the 'Centre for Monitoring Indian Economy. Experts report admits that in the fourth quarter [Q4] of this financial year, which is January-March of 2020, that is before the coronavirus pandemic set in, the GDP growth rate on an annual basis had further declined to 3.1%. Around 140,000,000 (14 crores) Indians lost employment during the lockdown. More than 45% households across the nation reported an income drop as compared to the previous year. Various business such as hotels and airlines cut salaries and laid off employees. Different phases of India's lockdown up to the "first unlock" on 1 June had varying degrees of the opening of the economy. The centre allowed all industries and markets to reopen and curfew time changed to 9pm to 5am. By mid-June, unemployment levels were back to pre-lockdown levels. Online sales reached normal level sales by June end. On 2nd July 2020, The Times of India reported that a number of economic indicators such as the manufacturers purchasing manager's index, goods movement, GST collections, electricity usage and rail freight transport showed significant improvement as compared to previous months. However, until getting the vaccination or therapeutic medicines, India need to control the spread with the enhanced lockdown and considerable relaxation in the affected areas by ensuring the adequate social distancing to mitigate the pandemic situation effectively. It is mandatory for every individual of nation should aware, maintain social distancing and personal hygiene. In conclusion, the chronological study presented in this paper declares Indian government regulated this historical viral outbreak in effective manner by curfews, closures of educational institutes, restrictions of non-essential businesses and restrictions of mass gatherings. The contribution of Health Ministry and ICMR is remarkable in hospitalization of infected patients and in developing vaccine. Exponential growth analysis predicts that the morbidity rate will be increased to 0.43% to the total population on 7th September 2020. The nation should be follow above the suggestion for effective management of this viral infection in future.

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