



## FLATTEN THE CURVE AND RAISE THE LINE TO REDUCE THE RISK OF COVID-19

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### Abstract

*COVID-19, caused by the coronavirus, has led to a pandemic that threatens everyone. Everyone in the world is worrying about COVID-19 (Corona Virus Disease-19). In late December 2019 an unidentified Corona virus, currently named as COVID-19 emerged from Wuhan, China. In this paper a brief description is given on Corona virus, its effects, safety measures and various modes of transmission of the virus. A comparative study was also done on the situation and safety measures of various countries to control the pandemic. In our study, it is observed that this virus is not a living organism and it has a genetic material inside an envelope. It is covered with the fat envelope known as lipid envelope. There are two different types of viruses namely Endemic and Pandemic. An Endemic is something that belongs to a particular people or country where a Pandemic is an epidemic that spread's over different countries and continents. An Epidemic is a disease which affects a large number of populations within the region. Many researchers are working on these viruses. Corona virus is an Epidemic initially as it was born in Wuhan, China but its geographical Spread turned it into a Pandemic declared by World Health Organization (WHO) [XIII]. 200 plus countries were affected by this Virus. Long ago the similar kind of RNA sequences was circulated in Bats also known as SARS- COV (1) which created severe acute respiratory problems for the victim. After a few years another virus MERS- COV was identified [XVIII, XV].*

**Keywords :** Corona Virus, COVID 19, Respiratory Syndrome, corona effects, Transmission of corona, effects of corona.

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### I. Introduction

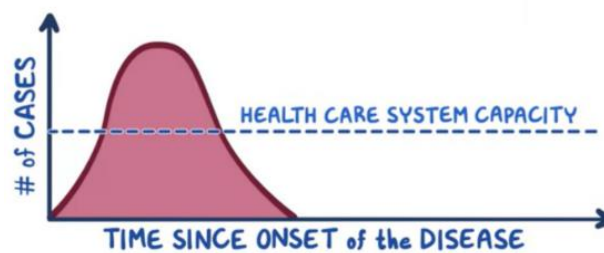
In December 2019, COVID-19 or coronavirus was discovered which is turned as pandemic. Corona viruses initially circulating among bats, which are a natural animal reservoir that seems to have mutated and ultimately started causing disease in humans. As per the latest studies as of April 25<sup>th</sup> 2020, roughly in four months there have been 30 lakhs plus positive cases and nearly 2lakh plus deaths,

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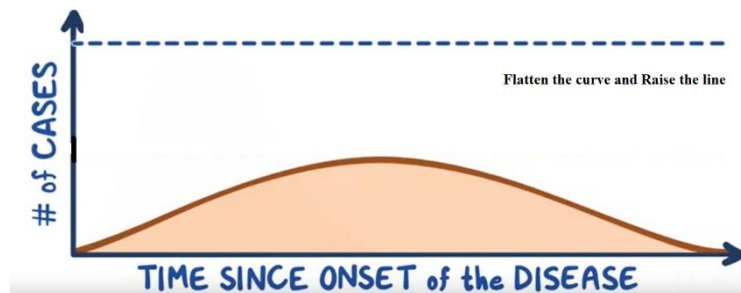
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resulting in a fatality rate of 5%. World Health Organization (WHO) specified that this rate may change and it is difficult to predict [XX]. Different countries responded in different ways to this disease.

An epidemic curve shown in Fig: 1 is plotted between number of cases each day and healthcare system in the country. X- Axis represents healthcare system and Y- axis represents the number of patients. Healthcare system includes number of beds, ventilators, availability of doctors, health workers, para medical staff, Personal Protective Equipment (PPE) and resources. Different countries following different strategies to reduce the damage and overcome this pandemic. Ultimately the goal of every country is to “flatten the curve and raise the line” shown in Fig: 2.



**Fig. 1:** Epidemic Curve



**Fig. 2:** Flatten the curve and raise the line

## **II. Flatten the Curve**

Flatten the curve is possible only by increasing the healthcare resources to fulfil the patient's requirements. Few patients might have already taking treatment for other routine diseases like heart problem, infections and disorders may also take care during this period. All the countries come closer to their capacity line and if the pandemic is spreading with same speed then cases will increase and it crosses the line. If it happens then controlling COVID-19 is impossible and one can't fulfil the needs of COVID-19 patients which results in drastic increase in mortality rate [XII]. The only solution to this situation is ensuring safety of the public i.e. ensuring public get sick at a slower rate by this we can achieve flattening of the curve. Maintaining

social distancing is one of the major key factors to reduce the spreading of the pandemic. Governments instructed strictly not to run schools, public gathering places, sporting and social events. In view of public health majority of the countries implementing Lockdown. Country economy will be affected much with lockdown but public health is considered at high priority. It is important to bring awareness among public about COVID-19 like maintaining social distance, wearing masks, washing hands frequently and maintaining personal hygiene by articles, social media, digital media, print media and news articles. One should be in isolation if suspected and confirmed cases [IX].

### **III. Raise the Line**

Raising the line means increasing the healthcare capacity. Healthcare system is functioning hard to flatten the curve and at the same time they need to react faster to fulfil the high demand. The strategies are different for each country. China built a hospital in 10 days and in other countries many stadiums are converted as isolation centres. To fulfil the demand hospitals, need to increase number of beds, ICU's, Ventilators, PPE's, staff and doctors. At the same time providing online healthcare medication and telemedicine facility is important to make the public utilize services from home which reduces the doctor's burden during this tough time. It also separates the COVID-19 patients and normal patients. Doctors must be at utmost care while treating COVID-19 patients. Doctors and supporting staff wear PPE (N95 mask) during their shift. Raise the line is also possible by discharging the patients recovered from the disease at the earliest, increasing the staff in hospitals and guiding the less symptoms patients to stay at home in self quarantine and observing them. This will help the doctors to take care of the patients who really in need of them. Finally, the point to be considered is to avoid the overwhelming healthcare system one should see the curve should be below the capacity threshold i.e. resources should be enough to fulfil the demand [XIX, X].

### **IV. Plan of Action of Few Countries:**

#### **China:**

China is the first country which dealt with COVID 19. December 31<sup>st</sup> China informed the WHO about COVID-19. On January 24<sup>th</sup>, China implemented lockdown in the Hubei province and other effected areas. Strict instructions were given to the authorities to see the public must stay at home and they allowed only for emergencies like medical needs and groceries. Public transportation, schools and public gatherings were completely stopped. One entry and one exit system came in to picture and all the public should undergo screening while passing through this passage. If anyone tested positive then the entire community might be quarantined. With these safety measures the number of new cases drastically reduced [VII]. At the same time China also concentrated on raising the line by constructing multiple hospitals, importing doctors and supporting staff from non-affected regions, availability of well-designed PPE. By the second week of March China back to normal with their businesses and activities.

**South Korea:**

To flatten the curve South Korea conducted mass testing i.e. they established huge number of testing stations. For ex: inside the car, Phone-booth stations and other areas so that people can walk in have test and leave and they made testing is absolutely free. They tested approximately 3.2 lakhs of people by the mid of March out of 51 million population i.e. they tested 1 out of 167 people. All the positive cases are either sent to hospitals if the symptoms are severe or quarantined if they have mild symptoms. Simultaneously they also concentrated on people who are in contact with the positive cases and treating them for reduces the spread of virus [I]. Lockdown is implemented the regions where they identified the cases but not societal level. They worked hard in identifying the positive cases and providing them with proper healthcare system and safeguarding the healthcare workers.

**United States:**

United States is the most effected country with COVID-19 in the world. As the number of cases is increasing rapidly and the mortality rate is also high. The testing is done for 1.3 lakh people by the middle of March i.e. 1 in 2424 people tested it is approximately 15 times lesser than South Korea. On January 19<sup>th</sup> they have their first case. By the end of April total number of cases is 11lakhs plus i.e. in the span of 100 days its increased drastically. Testing procedure is also little late in US hence to get the result it takes number of days meanwhile the positive cases are spreading the virus to others. It is difficult to identify whom to be isolated and whom to be tested in this situation. Then US government implemented mandated lockdown. Major damage already takes place before lockdown. At the same time shortage of PPE, N-95 masks resulted in infecting doctors and health workers, some are sent to quarantine and some to hospitals. Hence many doctors and health workers lost their lives with this pandemic [III, XI]. Demand increased for ICU's and ventilators. Many hospitals are in short of ICU's, ventilators and Hydroxychloroquine. Unfortunately, the mortality rate is high.

**India:**

First COVID-19 positive case in Kerala, India was identified on January 30<sup>th</sup> 2020. On March 10<sup>th</sup> six more cases identified in Bengaluru and Pune. All the positive cases have a travel history. On March 13<sup>th</sup> government instructed all the schools, colleges and public gathering places should be closed. Complete lockdown implemented from March 22<sup>nd</sup>. In the middle of March there are only 76 positive cases in India. Simultaneously India also concentrating on raising the line by increasing the facilities in Hospitals, PPE and medication. Quarantine the all travel history people and continuing the lockdown gave better result in India in controlling the Pandemic. By the end of the April 2020 the total number of cases in 30,000 plus. 12% of the people dying with COVID-19. India increased its capacity in producing Hydroxychloroquine and exporting to the other countries in need. Studies say lockdown and social distancing will be the only option to reduce the spread of the virus [XVII].

## **V. People Affected by COVID-19:**

Mortality rate due to COVID-19 is varying for different age groups [XVI]. It is showing its effect more on senior citizens, pregnant women and people with hypertension, diabetes, cardiovascular disease, chronic respiratory disease, cancer and any other health issues related to this. If we observe the patients 80% of them have mild infection and in some people no symptoms at all. Few people may have fever, cough and shortness of breath. Symptoms like fatigue, loss of taste and smell is also observed in some cases. Patients with lung problems like Pneumonia, which results in severe respiratory distress syndrome, were severely affected by COVID-19. During this time blood pressure falls down and infection increases which makes the body short for oxygen. This leads to the death. Youngsters and healthy persons can go on develop pulmonary fibrosis, a chronic lung condition will definitely show its impact on quality of life.

If we observe the reason behind the wide spreading of corona virus is due to the people who do not show any symptoms even if they effected with COVID-19. Unknowingly they spread this virus while interacting with the society. We call these persons as pre symptomatic people. The other reason for spreading is with symptomatic people, when they sneeze or cough [IV, VI]. The tiny particles dropped from them may fall on another person's mouth, nose and eyes. The virus may not travel for longer distance in air but it remains in air up to 3 hours, during these 3 hours if someone interacted with that air may get effected with the virus [VIII, II]. This virus also survives on surfaces, the duration may be different on different surfaces like on plastic & steel it survives up to three days, one day on cardboards, five days on wooden and glass items. Frequently touched surfaces like door handles, lift button, cell phones, remotes etc. should be cleaned thoroughly with alcohol-based sanitizers.

The incubation period is 5 days i.e. symptoms develop after 5 days if a person is infected with COVID-19. We don't know how many pre symptomatic people around us and how worse it going to spread. Individuals with mild symptoms are quarantined and people with severe infections should be sent to hospitals and care should be taken by providing fluids, oxygen and ventilator support if required [V, XIV]. Coming to the medication, right now the drug which is used for malaria is showing good results on COVID-19 patients. All the countries are started clinical trials on developing Vaccines and expecting it in 2021.

## **VI. Conclusions:**

Countries around the world are facing tough time and almost people living with COVID-19 virus from last four months. There are many ups and downs in these four months, countries affected psychologically and financially. Every country working hard to flatten the curve and raising the line. China and South Korea succeeded in this and in US, Italy, Iran, India and Russia the numbers are continuously increasing. Social distancing, lock down and mass testing are the key components in controlling the pandemic. Building more hospitals, increasing the health care workers and supporting staff, sufficient PPE are helping in raising the

line. Prevention is better hence staying isolated, careful hand washing and avoids touching the surfaces will give better results.

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