Chapter 1
Insights of NCoV 19 and COVID19

COVID 19, a contagious respiratory disease caused by Novel Corona Virus 19 or Severe Acute Respiratory Syndrome Coronavirus 2 is a major concern of the decade. A highly contagious microbe of Coronavirus family named Novel Coronavirus 19 (NCoV19) has badly affected China, USA, Italy and other European countries, India, Brazil, Russia which spread rapidly and took the whole world into its custody. COVID 19 has provoked the world with its quick spread and uncontrollable infection. It was first identified in Wuhan city of China which later spread throughout the globe causing the major pandemic of 2019.

The first sample obtained was in Wuhan, China with a patient complaining the symptoms of pneumonia of unknown etiology. Bronchoalveolar samples were collected from the victim and processed for real time PCR (RT PCR) assay. Results of the analysis revealed the identity of the samples close to beta corona virus. Further the study was extended to sequence the whole genome of the organism using illumine and nanopore sequencing [1]. In silico analysis based on bioinformatics genomic tools revealed the identity of the organism to be related to the beta corona virus 2B lineage. Further in silico annotation of the viral genes indicated that they belong to the corona virus family exhibiting features similar to this group [2]. The alignment studies of this genome to the corona group revealed the identity to be very close (96% identity) to bat SARS-like coronavirus strain BatCov.

1.1 Symptoms and Characteristics of COVID19

The basic symptoms of the disease include Dry Cough, Fever, loss of appetite, fatigue, loss of smell and difficulty in breathing [3]. Primarily lungs are affected leading to serious alteration in the respiration process and hence a prominent difficulty in breathing is reported in most of the patients [4]. However the disease is asymptomatic in most of the cases making it further a hurdle for early screening and diagnosis. The
major concern in the disease is its contagious nature and currently no suitable drug or vaccine could be designed against the Virus. The incubation period of the virus may range between 4 and 14 days depending upon the innate immunity of the individuals [5]. The mortality rate of the COVID was reported to be 3% across the globe [6].

1.2 Statistics of COVID19

Laying its first case reported in Wuhan city of china [7] COVID 19 infection has emerged like a forest fire and has created a global pandemic of the decade. The countries experiencing the major impact of this pandemic are China, South Korea, Italy, Iran, Japan and America. Currently India is in the 2nd stage of COVID epidemic [8] and the number of victims is exponentially increasing day by day.

The pie charts (Figs. 1.1, 1.2 and 1.3) show the statistics of COVID infection in India. It can be inferred that Maharashtra shows the highest incidence (32.1%) of COVID infections in India which is followed by Tamil Nadu (14%) and Delhi (13.7%). The Mumbai district of Maharashtra has been reported to be the district with maximum COVID cases. All the other states show a relatively lower incidence.
of infection. The relative percentage of deaths due to COVID among various states of India follows the same frequency pattern-Maharashtra being the top most state in Death cases due to COVID which is followed by Tamil Nadu and Delhi.

The graphs (Figs. 1.4 and 1.5) show the COVID infection statistics and represent the top 30 districts by total infected persons as on 20th June 2020. Further, a comparison between the Mortality rate and Recovery rate of COVID infection among these 30 districts has also been done. Gurugram of Haryana shows the lowest mortality rate and also a lesser degree of recovery. The highest rate of mortality is reported in Jalgaon of Maharashtra which shows even a good recovery rate.

The graphs (Figs. 1.6, 1.7 and 1.8) show the state wise statistics of COVID Infection, Recovery rate, Death Rate, Hospitalization time etc. Both the graphs show the statistics in the form of Bubble size. Larger bubble size in the 1st Graph shows the Recovery rate of COVID Vs Death rate. Tripura shows the highest bubble size indicating a higher recovery rate. The second graph shows a comparison between Case Load Vs Period of Hospitalization.
Fig. 1.5  The mortality and recovery rates in top 30 districts by total infected

Fig. 1.6  Recovery versus death (bubble size represents recovery per death)

Fig. 1.7  Percentage of case load versus average period of hospitalization
1.3 SARS Corona Virus 2

The novel corona virus is a positive sense single stranded RNA virus [9] belonging to the SARS Corona group with a little varied gene makeup making it a novel organism. The virus is spherical with numerous spikes projecting on the surface giving its peculiar appearance [10]. The genome of the organism is 27–30 KB with genes coding for different structural proteins like Membrane (M) protein, Envelope protein (E), Spike Protein (S) and Nucleocapsid (N) protein. These structural genes are essential for the virus assembly and trafficking [11]. The non-structural genes include ORF, Viral replicase etc. The spike protein of the virus enables the anchoring of these viral capsids onto the host cell membranes [12] (Fig. 1.9).

Fig. 1.8 Tests per million versus confirmed per million (bubble size represents test positivity rate). Data source of Figs. 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7 and 1.8—Covid19india.org (as on 20.6.2020)

Fig. 1.9 Structure of the SARS CoV 2019 [13]. Source https://commons.wikimedia.org/wiki/File:3D_medical_animation_corona_virus.jpg
1.4 World Health Organization Response towards COVID19

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. The best way to prevent and slow down transmission is to be well informed about the COVID-19 virus, the disease it causes and its spread Protect yourself and others from infection by washing your hands or using an alcohol-based rub frequently and not touching your face.

The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it’s important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow). At this time, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments.

One can reduce your chances of being infected or spreading COVID-19 by taking some simple precautions:
- Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water.
- Maintain at least 1 m (3 ft.) distance between yourself and others.
- Avoid going to crowded places.
- Avoid touching eyes, nose and mouth.

| Location     | Confirmed | Recovered | Deaths |
|--------------|-----------|-----------|--------|
| United States| 2.51M     | 771K      | 127K   |
| Brazil       | 1.28M     | 698K      | 56,109 |
| Russia       | 628K      | 393K      | 8,969  |
| India        | 509K      | 296K      | 15,685 |
| United Kingdom| 309K | -         | 43,414 |

Fig. 1.10 Image as a screenshot from Google.com (COVID 19 spread and majorly effected countries (As on 27th June 2020, 6.00 p.m. IST)
If someone has fever, cough and difficulty breathing, seek medical attention, but call by telephone in advance if possible and follow the directions of your local health authority (Fig. 1.10).

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