

A Review On Covid-19

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Abstract:

COVID-19 (Corona Virus Disease 2019) is a matter of concern since the end of the year 2019, when China informed WHO that there is some pneumonia-like disease with unknown causes in Wuhan. Corona disease is related to the SARS-CoV-2 i.e. Severe Acute Respiratory Syndrome Corona Virus 2. SARS CoV-2 is the strain of coronavirus that causes the disease. Coronaviruses are a group of single-stranded viral RNA genome. WHO has declared COVID-19 as pandemic. Among the various varieties of coronavirus, six are known to infect the human host and cause respiratory diseases. Belonging to the family “Coronaviridae”, coronavirus causes a broad spectrum of human and animal diseases. In this review, we have worked to possibly cover all the information about coronavirus.

Keywords: COVID-19, Corona, Respiratory Disease, SARS CoV-2, RNA.

Introduction:

The novel coronavirus, also referred to as nCoV was firstly encountered in Wuhan, China at the end of the year 2019. And as of November 2020, the total number of cases reached a new milestone of approx. 55.6 million, out of which total fatalities have reached 1.34 million and the counting is still on. The cases are reaching out at an alarming rate due to strong human to human transmission. The outbreak of SARS-CoV (Severe Acute Respiratory Syndrome Coronavirus) in 2002 was the first attack of coronavirus, furthermore, the outbreak of MERS-CoV (Middle East Respiratory Syndrome Coronavirus) in 2012 was second of its type. Now the novel coronavirus (nCoV) is the third of its type to infect the human population on a large scale in the last two decades.^[1-2]

Microbiology:

Coronaviruses are enveloped, positive-sense RNA viruses. The size of coronavirus ranges from 60nanometers to 140nanometers in diameter. They possess a spike-like protrusions on its outer surface, when viewed under an electron microscope, which assimilates the crown. Due to its similitude to the crown, the name “Coronavirus” has been given.^[3]

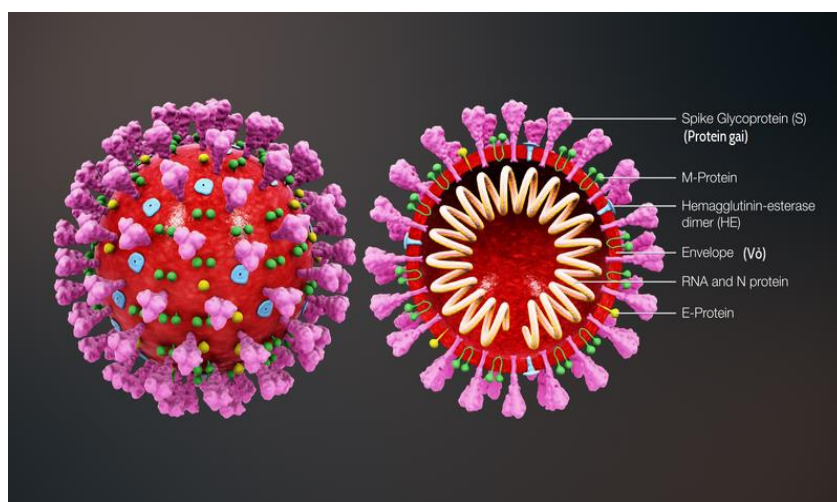


Fig 1: Figure showing the structure of coronavirus. [4]

Coronavirus is spherical or pleomorphic in shape and is covered with glycoproteins. These mainly have four subtypes namely, α , β , γ , and δ . These are responsible for the disease in humans and animals too. [5] The viral genome of coronavirus is about 30 (26-32) kb pairs. The viral structure has S-spike protein, M-membrane protein and N-nucleocapsid protein and E-envelope protein. The α coronavirus (HCoV) causes potential health risk to humans, while β coronavirus causes severe acute respiratory syndrome. The γ coronavirus also known as Infectious Bronchitis Virus (IBV), has been known to cause respiratory tract infections and kidney damage in chickens. [6]

Introduction of Coronavirus into Cell and Its Replication:

Coronavirus gets replicated into the host cell's cytoplasm. The virus gets bound to the surface of the cell with the help of S-spike protein. When this spike protein (s-protein) gets bound to the cell's receptor, then the conformational changes occur into the viral structure and the entry of the virus into the cell begins. This process is endocytosis and is dependent on the pH of the receptor. After getting into the cell's cytoplasm, the virus releases the RNA genome. The genome constitutes of seven genes. The replicase gene 1 encodes two ORF (open reading frame) which gets translated into the two polypeptides. These polypeptides are of 16 units, the non-structural proteins (nsp) get converted into viral protease. These 16 proteins also form a double-membrane vesicles (DMV) and this DMV is the viral Replication and Transcription Complex (RTC). [7,8]

Spread and Transmission of Coronavirus:

In December 2019, Wuhan, a city under Hubei province in China has reported a large number of patients with pneumonia which was caused by unknown causes. Some of the commencing cases had a common exposure to the Wuhan wholesale sea-food market. So, in earlier stages, it was thought that this seafood market was the place from where this disease or say pandemic was transmitted. [9] However, further genomic investigations were made and it was concluded that the virus had another source and it was boomed at that market to cause more human to human transmission. Further, the transmission from infected people to other family members and medical workers confirmed the case of human to human transmission. [10]

On 31st December 2019, China informed the World Health Organization (WHO) of the outbreak of disease. On 1st January 2020, the Wuhan market was closed to stop the public contact and transmission. The samples from various surveillance system was sent to medical labs for causative investigations. Later on, January 7th the virus was recognized as Coronavirus which was approximately 90% similar to bat coronavirus. There was an exponential growth in the number of cases and it also

affected the persons who did not have any contact with the Wuhan seafood market, which also confirmed the human to human transmission of the virus. The Chinese New Year event was a massive reason for the spread of epidemic into other countries such as Thailand, Japan, and South Korea. The enormous movement of Chinese migrants pose the world to a new health risk.^[9,10]

The transmission of disease was also reported by the bat as they are a potential vector for the coronavirus. They live in the colonies and possess a great deal with the horizontal spreading ability i.e. intraspecies transmission, and vertical spreading ability of the coronavirus i.e. interspecies transmission. Bats are also identified for the transmission of the virus among populations such as the Ebola virus, which was spread through the bats only. The α strain of coronavirus which caused the disease in humans were originated from the bats. The genomic similarity was found to be 96% similar to coronavirus excluded from the China bat species. Here the droplet infection came into role. The virus spread through the blood droplets, other discharges, shared cages, slaughter utensils etc.^[11]

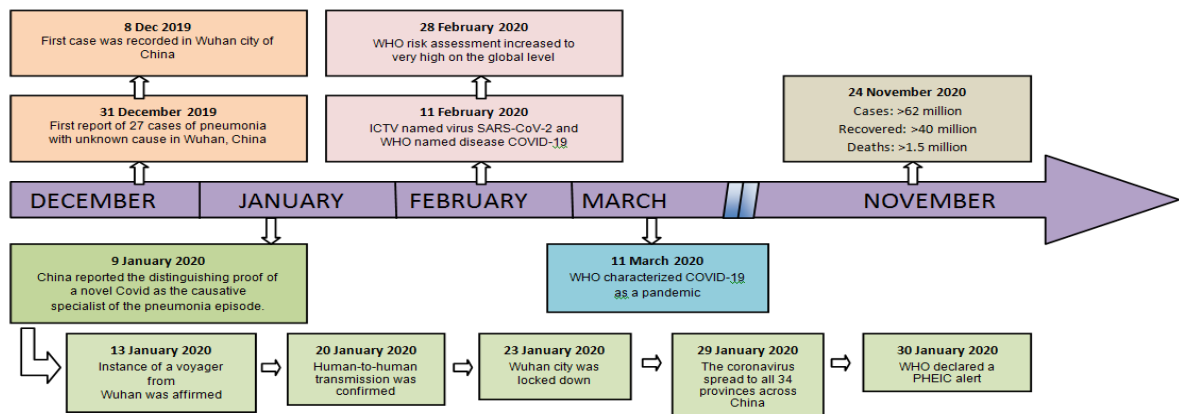


Fig 2: Timeline of spread of coronavirus.^[12]

Symptoms of Coronavirus Disease:

Symptoms for coronavirus patients are as follows:

Dry Cough: This has been a serious symptom in the coronavirus patients. Maximum patients suffering from the disease have been reported with these symptoms.

Fever: Fever is seen in at least 99% of the patient.

Sore throat: Sore throat is also recorded in the number of patients suffering from coronavirus and is also used as a major symptom for the above.

Respiratory Insufficiency: The coronavirus patients show difficulty in breathing and they and also increases the risk of the blood pressure.

Headache: Mild to severe headache is persistent in the patients.

Tiredness: The corona positive patient feels tired and exhausted and is not able to work or do anything efficiently.

Loss of taste and smell: This symptom has also been reported in the number of patients.

Apart from all these symptoms, some patients are suffering from chronic diseases such as, T.B, cancer, diabetes, and hypertension which poses a great risk to their health. Geriatric and pediatrics are more susceptible to the corona attack as they have low immunity.^[13]

Diagnosis of COVID-19 Patients:

The patient suffering from COVID -19 is confirmed, if he has a fever, headache, sore throat, and breathing abnormality or anyone who has a travel history to the corona containment zone or any meeting with the corona positive patient. A person who is having a travel history in the recent few

weeks is also kept in medical care for days. A case is confirmed with the help of molecular tests by testing the respiratory samples such as sputum, oropharyngeal swab, nasopharyngeal swab. The presence of virus may also be detected in blood. The collected samples are then transported to the laboratories certified by the Government, for the testing of coronavirus. The collection of the respiratory tract samples must be according to the guidelines provided by the government. The transportation of samples must be carried out at 4°C. In large number of confirmed cases, the WBC(white blood cells) count is usually less than 1000. The platelet count remains unaffected or slightly altered. The ESR remains elevated and procalcitonin remains normal. The increased procalcitonin level reveals the bacterial infection. CT (Computed Tomography) Scan proves to be more useful for the diagnosis of corona patients as it shows the bilateral infiltrates and ground-glass opacities. CT scan has also been useful in diagnosing the asymptomatic patients also. ^[14,15]

Prevention from Coronavirus:

Coronavirus can be prevented by following ways and precautions.

Hand Washing: To prevent coronavirus transmission and spread, one must always wash their hands with the hand wash and soaps at least for 20 seconds.

If soaps and hand wash are not available than sanitizer can be used with at least 60% alcohol.

Washing hand regularly reduces the chances of transmission of virus.

Avoid Touching Face: Avoid touching the face, nose, eyes with the hands especially when then they are unwashed. Face and nose are the direct openings to the body and the virus may enter freely through them to the body.

Limiting Social Contact: Since this virus spread with the human to human transmission, the social contact must be reduced and there must not be close contact between the people. According to the Indian Govt. guidelines, there must be a distance of 1 meter between two people to follow the rules of social distancing. Elder people, kids, and those who are likely to have the symptoms of the coronavirus must take more precautions and must stay at home. If a person is sneezing and coughing or he is showing any symptoms of Covid than he must stay home and must follow the social distancing guidelines. Occasions such as public gathering, parties, devotion in temples must be held according to the latest guidelines issued by the government. Bars, restaurants and hotels must also be regulated in a healthy and clean manner and they must also comply with guidelines issued by the government.

Use of Face Mask: Face mask should be used to prevent the droplet infection. The person who is sneezing and coughing must mandatorily use the face mask. The hands must be sanitized before the application and before the removal of the mask. It is to regulate that there is no gap between the face and the mask. The mask should cover both nose and mouth. There must not be any direct contact to the mask after its application. Don't use disposable masks twice. ^[16]

Use of PPE Kit: PPE i.e. Personal Protective equipment is most important for the prevention of disease. This is mainly used by the healthcare professionals who are serving for the betterment of the patients. PPE kits include masks, gowns, headgear, goggles, and gloves. These are very efficient and expensive too. ^[17]

Impact of Coronavirus on Various Sectors:

On Education System: Various universities have been affected by the coronavirus outspread. Various universities announced the termination of physical classes and have started to conduct the classes over video conferencing apps. The faculties of universities have started to prepare lesson plans to ensure proper online classes. The conductance of online classes have arisen various questions on the assessment of the students based on various parameters. ^[18] The project works, assignments, and many continuous assessment cannot be performed over online methods. ^[19] Those faculties who are not techno-savvy will face problems in conducting the online classes.

Conductance of Semester Exams: Semester exams are hard to conduct in these tough situations. Many of the universities have announced to promote their students. Some of the universities have planned to conduct the end semester exams, but then the problem of conducting exams fairly exists too.^[20] Online exams cannot ensure the integrity of the exams. The faculties will have to apply appropriate methods for the evaluation of the examinations.^[21]

International Students: Those students who are coming from other countries to study here will also face certain problems as there is no proper transportation available for them. Students are missing their projects works and practicals. Government of India has issued new guidelines regarding the international arrivals. This will ease the international students to resume their practical studies. Those who are stuck here in the hostel are also in trouble. The college administration will have to provide them food, safety, and security.^[22,23]

Mental Health: Covid-19 has disrupted the lives of people all over the world. The fear of what will happen next has shook the world. The uncontrolled increase in the number of cases has tormented the mental health of the people across the globe. It has created a sense of insecurity and anxiety. Those who are living away from their hometown are not only concerned about themselves, but are also concerned about their families. The coronavirus outbreak has disturbed the daily routine of the people.^[24,25]

Agriculture: The COVID-19 outbreak has resulted in the crushed demand for vegetable products. The shutdown caused the closure of hotels and restaurants which affected the demand for agricultural commodities by 20%. The increased sense of social-distancing and securing oneself has made them avoid the carriers of the virus. The people started avoiding delivery boys, vendors etc. This has also caused a reduction in demand for agricultural products. Due to low demands, the prices were also reduced and farmers had to suffer all the loss.^[26,27]

Healthcare: The COVID-19 outbreak has caused a great threat to the healthcare system also. The spread of coronavirus in healthcare workers is the greatest vulnerability worldwide.^[28] Also, the increased demand for N95 masks, gloves, and reduced production is not able to put great effort into patient care. The fewer number of ICU beds and ventilators is also affecting the patients' health care.^[29]

Pharmaceutical Industry: There is a great burden on the pharmaceutical companies to manufacture the active pharmaceutical ingredient (API) and drug molecules and export it to other countries. The coronavirus outbreak has increased the demand for medicines. Due to less production and export, it affects the revenue.^[30]

Tourism: The tourism sector is one of the hardest-hit sectors due to the COVID-19 outbreak. The risk of millions of tourism workers is at stake. As a consequence of the coronavirus outbreak, people are avoiding to visit places and are canceling their trips. The tourism sector of various countries will have to suffer a million to billion-dollar loss due to the pandemic.^[31,32]

Sports Activities: Various sports activities are affected as a consequence of corona. The conductance of Indian Premier League i.e. IPL, the most liked Indian cricketing format which was to be held in April - May has been postponed due to the coronavirus and is conducted in November. The World T-20 Cup, which is to be held next year is also at risk. The Tokyo Olympics which was to be held this year has also been postponed to next year in July 2021. The football play EURO 2020 tournament has been postponed for 12 months amidst coronavirus.^[33]

COVID-19 Cases in India:

In India, the coronavirus cases are increasing at an alarming rate reaching to more than 70000 cases per day. The state-wise data of India as on 18 November 2020 is as follows:^[34]

Table-1: State-wise data on COVID-19 cases in India.^[34]

State Wise Data Of Covid-19 Cases in India till 18 Nov. 2020				
S.No.	State	Active Cases	Cured Cases	Deaths
1.	Andaman and Nicobar Island	154	4378	61
2.	Andhra Pradesh	16516	833980	6899
3.	Arunachal Pradesh	1182	14715	48
4.	Assam	3285	206611	969
5.	Bihar	5349	221272	1201
6.	Chandigarh	1081	14833	253
7.	Chhattisgarh	18770	193997	2646
8.	Daman and Diu	29	3274	2
9.	Delhi	42458	452683	7943
10.	Goa	1364	44310	670
11.	Gujrat	12457	175362	3823
12.	Haryana	19543	184503	2093
13.	Himachal Pradesh	6901	24025	475
14.	J&K	5570	96972	1613
15.	Jharkhand	2637	103171	934
16.	karnataka	25165	829188	11578
17.	Kerala	69516	468460	1943
18.	Ladakh	924	6605	94
19.	Madhya Pradesh	9338	174202	3115
20.	Maharashtra	81207	1630111	46202
21.	Meghalaya	753	10014	103
22.	Odisha	7568	301777	1575
23.	Puducherry	705	35152	608
24.	Punjab	5937	132917	4541
25.	Rajasthan	19478	210779	2101
26.	Tamil nadu	14470	737281	11531
27.	Uttarakhand	4147	64032	1128
28.	Uttar Pradesh	21954	487221	7441
29.	West Bengal	26296	407769	7820

Conclusion:

This continuously emerging viral outbreak is challenging us in various ways. It is just devastating and affecting the lives of people. Earlier, only China was exposed to the viral attack but then after the whole world is suffering from the disease. There must be some technology to fight against these deadly viral outbreaks which affect all the social, physical, mental, and economic health of a society and country as well. This is also the responsibility of the people of the country to protect themselves by abiding the rules as set by the government.

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