

A Systematic Review of SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus) and COVID-19 (Coronavirus Disease-2019): The Pandemic

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ABSTRACT

The SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) disease (COVID-19) in China has caused a large global outbreak at the end of 2019 and now it is a major public health issue worldwide. On 30 January 2020, the world health organization (WHO) has declared COVID-19 a pandemic. After the analysis of cases and virus genetics, it was identified that the 2019 novel coronavirus is the cause of the outbreak. The mode of transmission of the virus is human-to-human transmission via droplets or direct contact; it has also been observed that this virus can show its effect even after 14 days. As of 14 June 2020, the outbreak of Coronavirus Disease 2019 (COVID-19) has affected the lives of 7.7 million people globally. Social distancing and isolation remain the most effective measure for containment of COVID-19. Among patients infected with COVID-19, fever and cough are the main symptoms followed by breathlessness. It has been also observed in various countries that some patients are asymptomatic with the infection. In various diagnosing investigations, it was noticed that this virus primarily affects the lungs in the body. Unnecessary use of different-different medications should be avoided because it can cause other major side effects that can be life-threatening. It was suggested that asymptomatic and mild to moderate symptomatic patients require symptomatic treatment with early supportive management. It consists of the use of acetaminophen, nutritional supplement, and antibacterial therapy. Severely ill patients require high oxygen flow, convalescent plasma, glucocorticoid therapy. This review provides updated information about the SARS-CoV-2 and COVID-19 that there is no specific drug or

vaccine is discovered which can treat this respiratory illness (till June 2020).

Keywords: SARS-CoV-2, COVID-19, WHO

INTRODUCTION

The world health organization (WHO) has declared the coronavirus disease 2019 (COVID-19) a pandemic. Coronavirus is the microorganism that primarily targets the lungs in the human body. History of the coronavirus outbreak includes the severe acute respiratory syndrome (SARS)-CoV in 2002 to 2003 and the Middle East respiratory syndrome (MERS)-CoV in 2012, which have been previously characterized as agents that are a serious issue to public health threat.^[1] In December 2019, a group of patients was admitted to hospitals with an unexplained low respiratory infection of an unknown cause. Due to the lack of identification of causative agents, the first cases were classified as pneumonia of unknown etiology. This cluster of patients was epidemiologically linked to the meat market in Wuhan, Hubei Province, China. Regarding the virus itself, the Chinese Centre for Disease Control and Prevention (CCDC) has renamed the previously provisionally named 2019-nCoV as severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), which is responsible for this pandemic.^[2,6] Most people infected with corona COVID-19 will experience mild to moderate lower respiratory illness and recover without taking any special type of treatment. Old

age patients and those patients who are already suffering from other medical conditions like CVS disease, diabetes, chronic respiratory disease, cancer, and other immunosuppressive conditions are more susceptible to develop a serious disease. Social distancing and isolation are the most effective methods to prevent and slow down the transmission of COVID-19 to date. Protect yourself and others by proper sensitization of hand and not touching your face. The primary mode of transmission of the COVID-19 virus is through a droplet of saliva from an infected person to others. There is no specific treatment or vaccine is available to date. Various clinical trials of vaccines and drugs are ongoing in many countries to find out the potential treatment for COVID-19. As of 14 June 2020, the outbreak of Coronavirus Disease 2019 (COVID-19) has affected the lives of 7.7 million people globally. Coronaviruses were first discovered in the 1930s when an acute respiratory infection was seen in chickens caused by infectious bronchitis virus (IBV). Coronaviruses are a group of viruses that causes disease in mammals and birds. The first human coronavirus was discovered in the 1960s. Name of some coronaviruses is SARS-CoV(2003), HCoV NL63(2004), HKU1 (2005), MERS-CoV(2012), SARS-CoV (2019). Most of these have caused serious respiratory infections. [2,3,6]

Epidemiology:- In December 2019, a group of pneumonia cases was clustered in Wuhan city in China were reported. Many researchers have shown Wuhan Seafood Market as the origin of COVID-19. On 12 December 2019, the first case of the COVID-19 epidemic was discovered with an unexplained lower respiratory infection. On 31 December 2019, a total of 27 cases of severe viral pneumonia cases were officially announced. Various etiologic investigations have been performed in patients admitted to the hospital with similar symptoms of viral pneumonia.

As of 14 June 2020, WHO revealed that there are 7.7 million confirmed cases reported worldwide. America has the largest number of COVID-19 cases followed by Brazil, Russia, and India. Total 428362 deaths reported till 14 June 2020 worldwide. Patients with mild to moderate symptoms and asymptomatic patients do not require any special kind of healthcare supervision. Isolation and symptomatic treatment are sufficient for these kinds of patients. [1,4,7]

Indian scenario of COVID -19:- At the time of writing this article, the risk of the coronavirus in India is extremely high, and it may get worse in the next few days. According to the ministry of health and family welfare and Indian council of medical research (ICMR), there are about 3.3 lakh confirmed cases reported and about 9522 deaths occurred in India till 14 June. Hence the following is recommended:-

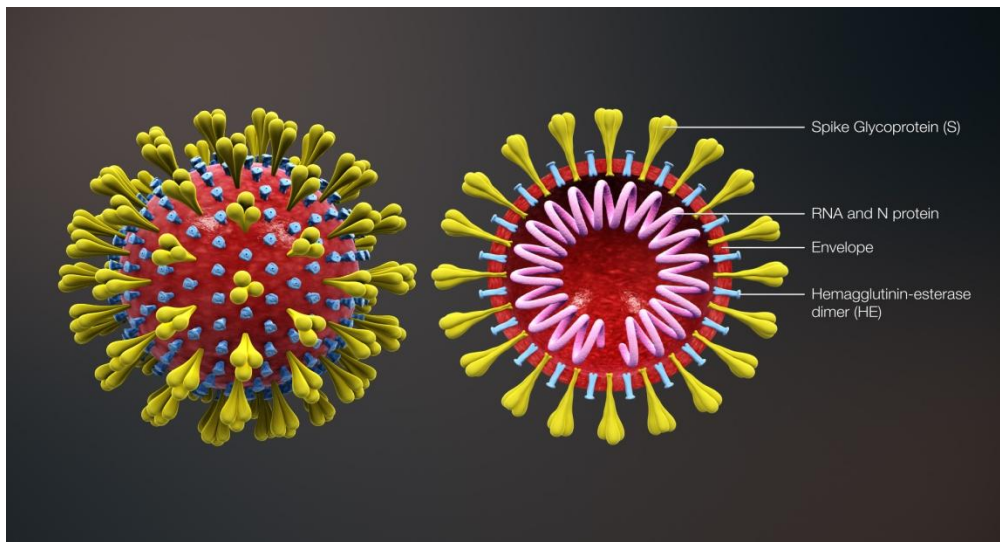
- Patients admitted with acute respiratory distress syndrome and severe pneumonia should be evaluated for travel history and contact history.
- All the health care professionals should take the travel history of all patients with respiratory problems and also take the travel history of a person who travelled internationally in the last 2 weeks as well as contact with any sick person who travelled internationally.
- Non-essential traveling should be avoided this time.
- Healthcare providers should wear masks and gloves while examining any patient with respiratory illness and also give the patient a simple surgical mask to wear.
- Suspected cases should be isolated under the government designated centers for isolation and testing (in Jaipur, Rajasthan at this time it is SMS hospital).
- All healthcare professionals should keep themselves updated about the advisories and recent updation given by regulatory authorities.

- People should not believe in any kind of false information and myths about the disease. [1,5,7]

Structure of coronavirus- :

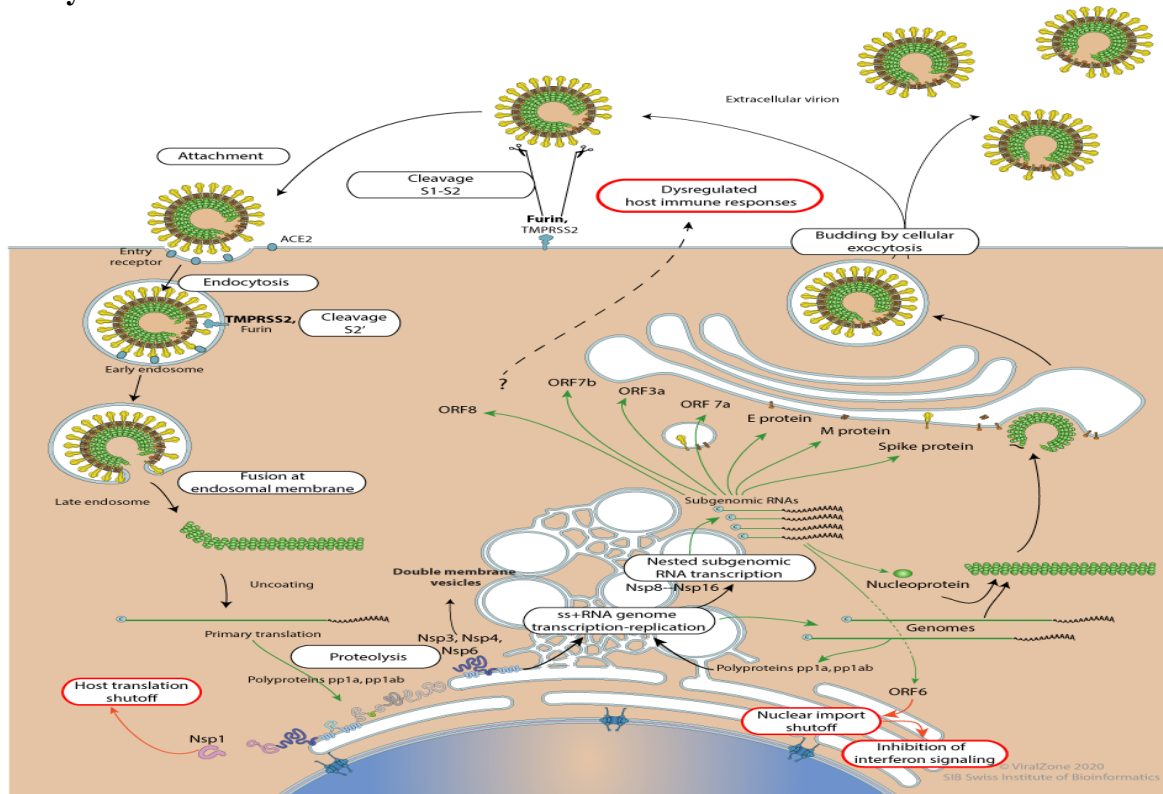
Coronaviruses are large pleomorphic spherical particles with bulbous surface projections. The average diameter of the

virus particle is around 120 nm. The virus covered with an envelope-like structure that consists of the lipid bilayer. Nucleoside present inside the envelope formed from the multiple copies of N-protein. The lipid layer bilayer envelope, membrane proteins, and nucleocapsid protect the virus when it is outside the host cell. [7,8]



{ Fig 1: A cross-sectional model of a corona virus, scientificanimations.com/Wikimedia Commons, CC BY-SA }

Life cycle of corona virus-:



{fig 2-: The life cycle of corona virus, SIB Swiss Institute of Bioinformatics }

Signs and symptoms of COVID-19:-

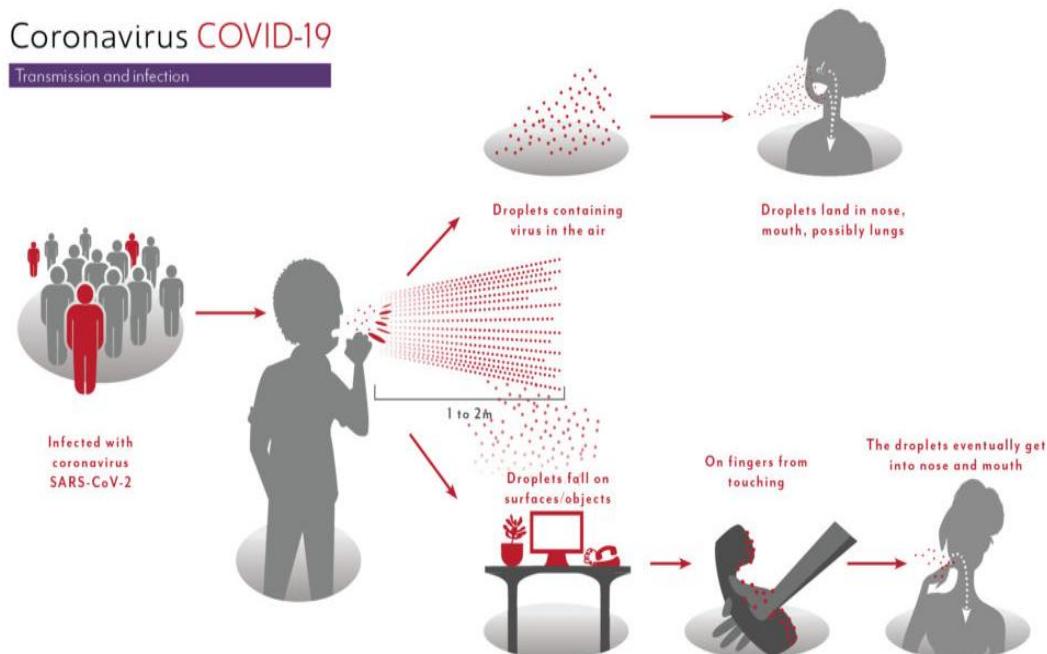
COVID-19 affects different people in different ways. Most people develop mild to moderate symptoms and they do not require hospitalization for recovery. In some people, it shows severe symptoms in that condition patients require proper oxygen supply and intensive care.

- Common symptom- fever, dry cough, fatigue

- Less common symptoms- Headache, conjunctivitis, diarrhea, rashes, and discoloration of the skin, sore throat, loss of appetite, muscle pain, pain in joints, coughing up sputum, nasal congestion.

- Severe symptoms- Difficulty in movement and speech, chest pain or pressure, shortness of breath, confusion, bluish face or lips, kidney failure, high-grade fever.

Transmission of COVID-19-



(Source of picture- world heart federation, university of cape town)

Fig 3. Shows various possible transmission routes of respiratory infection in an infected person to a normal person. In the figure, the expiration shows the coughing and sneezing airflows. Infection can transmit through close range airborne transmission and airborne droplets can then settle on the surface, from where they can be touched and carried on hands and clothes to further self introduced transmission. [4,5,8,9]

Prevention and control of COVID-19:-

To reduce the spread of COVID-19, we should closely follow the guidelines of regulatory authorities (WHO, CDC, ICMR) to protect the normal population and other patients. There are some important steps to prevent the spread of infection- :

- Hand sensitization (wash your hand with hand wash/soap for minimum 20 seconds or use alcohol-based hand sanitizer)

- Disinfect the frequently touched objects.
- Avoid close contact with a person who is sick
- Cover your mouth while going outside
- Avoid touching your eyes, mouth, and nose
- Stay home when you are sick
- Do not sneeze and cough in an open area, cover your mouth and nose with the tissue while sneezing.

Management of COVID-19:- social distancing and isolation remain the most effective method to prevent COVID-19 infection. No, specific antiviral drug or vaccine is currently available. Various clinical trials are going on in different countries to find out the effective drug or vaccine for COVID-19. Therefore, the treatment of COVID-19 includes symptomatic therapy and proper oxygen supply. Mild to the moderate ill patient requires only symptomatic treatment with early supportive management. It consists of the use of acetaminophen, nutritional supplement, and antibacterial therapy. Severely ill patients require proper oxygen therapy, extracorporeal membrane oxygenation (ECMO), and glucocorticoid therapy. A systemic corticoid is not recommended. Irrational use of antibiotics should be avoided in this infection. Patient with respiratory failure needs mechanical ventilation and high flow to nasal oxygen. Some studies suggest the use of plasma therapy in severely ill patients. In the case of multiple organ dysfunctions, organ function support is necessary. For the therapy alpha-interferon (aerosol administration), hydroxychloroquine, and lopinavir/remdesivir has been suggested. Some other antiviral drugs like ritonavir, abidor, ribavirin are also suggested, but the use of more than two antiviral drugs is not recommended. Some clinical studies advise that remdesivir can be used for prophylaxis and treatment of COVID-19. [3,7,10]

CONCLUSION

This review provides updated information about the SARS-CoV-2 and COVID-19 that there is no specific drug or vaccine is discovered which can treat this respiratory illness (till June 2020). Social distancing and hand sanitization is the most effective method to control the spreading of the virus. Patients with comorbidities like CVS disease, renal failures, diabetes, cancer, and neurological disease are more susceptible to develop serious illness and

have more chances of mortality. Use of remdesivir, hydroxychloroquine, and plasma therapy has become a controversial topic because WHO suggested that Remdesivir, HCQ, and plasma therapy has no effect against COVID-19 but still regulatory authorities like (ICMR in India) suggesting and giving green signal to use to these drugs and therapies for prophylaxis and treatment of COVID-19. Some more studies are required to clarify these kinds of controversies.

Declaration of competing interests: The authors declare no conflicts of interest.

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