

An Updated Review on CORONA VIRUS Outbreak a Global Pandemic: Symptoms, Treatment & Prevention of Severe Acute Respiratory syndrome.

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ABSTRACT

Corona virus disease (COVID-19; Corona virus disease 2019; Previously 2019-nCoV) is an infectious disease caused by a newly discovered corona virus originated from Wuhan in China. COVID-19 is a current worldwide outbreak of disaster in the 21st century. However, the lack of specific drugs to prevent an attack is a major need at this current point of time. Corona viruses are composed of enveloped virions that contain a positive strand RNA genome are characterized by club-like spikes that project from their surface. Human corona viruses may cause the common cold or severe respiratory illness. Corona virus disease spreads primarily through contact with an infected person when they cough or sneeze. It also spreads when a person touches a surface or objects that has the virus on it, and then touches their eyes, nose, or mouth. Social distancing is a non-pharmaceutical infection prevention and control intervention implemented to avoid/decrease contact between those who are infected with a disease causing pathogen, so as to stop or slow down the rate and extent of disease transmission in a community. This eventually leads to decrease in spread, morbidity and mortality due to the disease. Here we provide a brief introduction to corona viruses discussing symptoms, treatment and prevention of novel corona virus (nCoV).

Keywords: Corona Virus, Social Distancing, Diagnosis, Treatment.

INTRODUCTION

Until the very end of 2019, there were six coronaviruses known to cause disease in humans. Four of these result in little more than a common cold and are endemic around the world. The viruses known as human coronavirus (hCoV)-229E, hCoV-HKU1, hCoV-NL63, and hCoV-OC43 are of little concern at a global public health level. The other two, however, have caused more widespread concern. In 2002, severe acute respiratory syndrome coronavirus (SARS-CoV) emerged in the human population. In a matter of months, this virus from a bat that transmitted via a palm civet to infect a human in the Guangdong province of China infected over 8,000 people, killing roughly 10% (1). In 2003, SARS-CoV infections stopped, and the virus has not been seen since. A second epidemic coronavirus, known as Middle East respiratory syndrome coronavirus (MERS-CoV), emerged in 2012. Like the SARS-CoV outbreak, MERS-CoV started with a patient suffering pneumonia and came from a zoonotic event (this time from a bat via a camel to a human)^[1].

Since December 2019, SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2; previously known as 2019-nCoV) has generated over 70000 cases of COVID-19 (Corona Virus Disease 2019, formerly known as Novel Coronavirus Pneumonia, NCP) in China, including 1870 deaths, as of 17 February 2020 (National Health Commission of the People's Republic of China, 2020). Respiratory droplets and contact are considered the main routes of transmission. Currently, COVID-19 patients remain the primary source of infection; General Office of National Health Commission and General Office of National Administration of Traditional Chinese Medicine,

2020; Special Expert Group for Control of the Epidemic of Novel Coronavirus Pneumonia of the Chinese Preventive Medicine Association, 2020). We report a case of COVID-19 with recurrently positive SARS-CoV-2 ribonucleic acid (RNA) from an oropharyngeal swab test^[2]. In January, 2020, a novel virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was identified as the causative agent for a cluster of pneumonia cases initially detected in Wuhan City, Hubei province, China. SARS-CoV-2, which causes the disease now named coronavirus disease 2019 (COVID-19), had spread throughout China and to 26 additional countries as of Feb 18, 2020^[3,4].

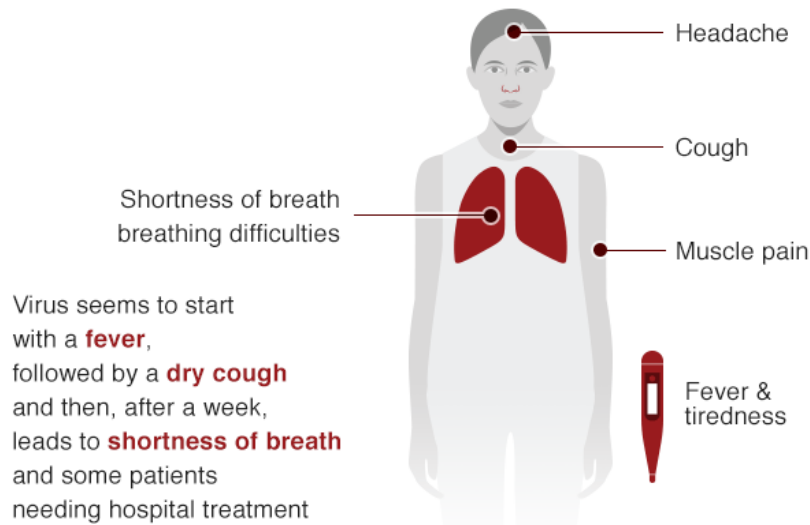
Corona viruses (CoVs) a large family of single-stranded RNA viruses can infect animals and also humans, causing respiratory, gastrointestinal, hepatic, and neurologic diseases^[5]. As the largest known RNA viruses, CoVs are further divided into four genera: alpha-coronavirus, betacoronavirus, gamma-coronavirus and delta-coronavirus^[6]. To date, there have six human coronaviruses (HCoVs) been identified, including the alpha-CoVs HCoVs-NL63 and HCoVs-229E and the beta-CoVs HCoVs-OC43, HCoVs-HKU1, severe acute respiratory syndrome-CoV (SARS-CoV)^[7], and Middle East respiratory syndrome-CoV (MERS-CoV)^[8]. New coronaviruses appear to emerge periodically in humans, mainly due to the high prevalence and wide distribution of coronaviruses, the large genetic diversity and frequent recombination of their genomes, and the increasing of the human-animal interface activities^[9,10].

CLASSIFICATION

Coronaviruses (CoVs) are the largest group of viruses belonging to the *Nidovirales* order, which includes *Coronaviridae*, *Arteriviridae*, and *Roniviridae* families. The *Coronavirinae* comprise one of two subfamilies in the *Coronaviridae* family, with the other being the *Torovirinae*. The *Coronavirinae* are further subdivided into four groups, the alpha, beta, gamma and delta coronaviruses. The viruses were initially sorted into these groups based on serology but are now divided by phylogenetic clustering.

All viruses in the *Nidovirales* order are enveloped, non-segmented positive-sense RNA viruses. They all contain very large genomes for RNA viruses, with *Coronavirinae* having the largest identified RNA genomes, containing approximately 30 kilobase (kb) genomes. Other common features within the *Nidovirales* order include: i) a highly conserved genomic organization, with a large replicase gene preceding structural and accessory genes; ii) expression of many nonstructural genes by ribosomal frameshifting; iii) several unique or unusual enzymatic activities encoded within the large replicase-transcriptase polyprotein; and iv) expression of downstream genes by synthesis of 3' nested sub-genomic mRNAs. In fact, the *Nidovirales* order name is derived from these nested 3' mRNAs as *nido* is Latin for "nest". The major differences within the Nidovirus families are in the number, type, and sizes of the structural proteins. These differences cause significant alterations in the structure and morphology of the nucleocapsids and virions^[11].

Symptoms of coronavirus (Covid-19)



Source: WHO

BBC

Doctors are learning new things about this virus every day. So far, we know that COVID-19 may not initially cause any symptoms for some people. You may carry the virus for 2 days or up to 2 weeks. Some common symptoms that have been specifically linked to COVID-19 include:

- shortness of breath
- having a cough that gets more severe over time
- a low-grade fever that gradually increases in temperature

These symptoms may become more severe in some people. Call emergency medical services if you or someone you care for have any of the following symptoms:

- trouble breathing
- blue lips or face
- persistent pain or pressure in the chest
- confusion
- excessive drowsiness

The full list of symptoms is still being investigated.

COVID-19 versus the flu

We are still learning about whether the 2019 coronavirus is more or less deadly than the seasonal flu. This is difficult to determine because the number of total cases (including mild cases in people who don't seek treatment or get tested) is unknown. However, early evidence suggests that this coronavirus causes more deaths than the seasonal flu. An estimated 0.06 to 0.1 percent. Trusted Source of people who developed the flu during the 2019-2020 flu season in the United States died (as of March 14, 2020). This is compared to 1.2 percent of those with a

confirmed case of COVID-19 in the United States, according to the Centers for Disease Control and Prevention (CDC).

Here are some common symptoms of the flu:

- cough
- runny or stuffy nose
- sneezing
- sore throat
- fever
- headache
- fatigue
- chills
- Body aches ^[12].

TREATMENT / MANAGEMENT

There is no specific antiviral treatment recommended for COVID-19, and no vaccine is currently available. The treatment is symptomatic, and oxygen therapy represents the major treatment intervention for patients with severe infection. Mechanical ventilation may be necessary in cases of respiratory failure refractory to oxygen therapy, whereas hemodynamic support is essential for managing septic shock.

On January 28, 2020, the WHO released a document summarizing WHO guidelines and scientific evidence derived from the treatment of previous epidemics from HCoVs. This document addresses measures for recognizing and sorting patients with severe acute respiratory disease; strategies for infection prevention and control; early supportive therapy and monitoring; a guideline for laboratory diagnosis; management of respiratory failure and ARDS; management of septic shock; prevention of complications; treatments; and considerations for pregnant patients.

Among these recommendations, we report the strategies for addressing respiratory failure, including protective mechanical ventilation and high-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV).

Intubation and protective mechanical ventilation

Special precautions are necessary during intubation. The procedure should be executed by an expert operator who uses personal protective equipment (PPE) such as FFP3 or N95 mask, protective goggles, disposable gown long sleeve raincoat, disposable double socks, and gloves. If possible, rapid sequence intubation (RSI) should be performed. Preoxygenation (100% O₂ for 5 minutes) should be performed via the continuous positive airway pressure (CPAP) method. Heat and moisture exchanger (HME) must be positioned between the mask and the circuit of the fan or between the mask and the ventilation balloon.

Mechanical ventilation should be with lower tidal volumes (4 to 6 ml/kg predicted body weight, PBW) and lower inspiratory pressures, reaching a plateau pressure (P_{plat}) < 28 to 30 cm H₂O. PEEP must be as high as possible to maintain the driving pressure (P_{plat}-PEEP) as low as possible (< 14 cmH₂O). Moreover, disconnections from the ventilator must be avoided for preventing loss of PEEP and atelectasis. Finally, the use of paralytics is not recommended unless PaO₂/FiO₂ < 150 mmHg. The prone ventilation for > 12 hours per day, and the use of a

conservative fluid management strategy for ARDS patients without tissue hypoperfusion (strong recommendation) are emphasized.

Non-invasive ventilation

Concerning HFNO or non-invasive ventilation (NIV), the experts' panel, points out that these approaches performed by systems with good interface fitting do not create widespread dispersion of exhaled air, and their use can be considered at low risk of airborne transmission^[13]. Practically, non-invasive techniques can be used in non-severe forms of respiratory failure. However, if the scenario does not improve or even worsen within a short period of time (1–2 hours) the mechanical ventilation must be preferred.

Other therapies

Among other therapeutic strategies, systemic corticosteroids for the treatment of viral pneumonia or acute respiratory distress syndrome (ARDS) are not recommended. Moreover, unselective or inappropriate administration of antibiotics should be avoided, although some centers recommend it. Although no antiviral treatments have been approved, several approaches have been proposed such as lopinavir/ritonavir (400/100 mg every 12 hours), chloroquine (500 mg every 12 hours), and hydroxychloroquine (200 mg every 12 hours). Alpha-interferon (e.g., 5 million units by aerosol inhalation twice per day) is also used.

Preclinical studies suggested that remdesivir (GS5734) — an inhibitor of RNA polymerase with in vitro activity against multiple RNA viruses, including Ebola — could be effective for both prophylaxis and therapy of HCoV infections^[14]. This drug was positively tested in a rhesus macaque model of MERS-CoV infection^[15].

In Italy, a great investigation led by the Istituto Nazionale Tumori, Fondazione Pascale di Napoli is focused on the use of tolicizumab. It is a humanized IgG1 monoclonal antibody, directed against the IL-6 receptor and commonly used in the treatment of rheumatoid arthritis.

When the disease results in complex clinical pictures of MOD, organ function support in addition to respiratory support is mandatory. Extracorporeal membrane oxygenation (ECMO) for patients with refractory hypoxemia despite lung-protective ventilation should merit consideration after a case-by-case analysis. It can be suggested for those with poor results to prone position ventilation.

PREVENTION ^[16]

Preventive measures are the current strategy to limit the spread of cases. Because an epidemic will increase as long as R_0 is greater than 1 (COVID-19 is 2.2), control measures must focus on reducing the value to less than 1.

Preventive strategies are focused on the isolation of patients and careful infection control, including appropriate measures to be adopted during the diagnosis and the provision of clinical care to an infected patient. For instance, droplet, contact, and airborne precautions should be adopted during specimen collection, and sputum induction should be avoided.

The WHO and other organizations have issued the following general recommendations:

- Avoid close contact with subjects suffering from acute respiratory infections.
- Wash your hands frequently, especially after contact with infected people or their environment.
- Avoid unprotected contact with farm or wild animals.
- People with symptoms of acute airway infection should keep their distance, cover coughs or sneezes with disposable tissues or clothes and wash their hands.
- Strengthen, in particular, in emergency medicine departments, the application of strict hygiene measures for the prevention and control of infections.
- Individuals that are immunocompromised should avoid public gatherings.

The most important strategy for the populous to undertake is to frequently wash their hands and use portable hand sanitizer and avoid contact with their face and mouth after interacting with a possibly contaminated environment.

Healthcare workers caring for infected individuals should utilize contact and airborne precautions to include PPE such as N95 or FFP3 masks, eye protection, gowns, and gloves to prevent transmission of the pathogen. Meanwhile, scientific research is growing to develop a coronavirus vaccine. In recent days, China has announced the first animal tests, and researchers from the University of Queensland in Australia have also announced that, after completing the three-week in vitro study, they are moving on to animal testing. Furthermore, in the U.S., the National Institute for Allergy and Infectious Diseases (NIAID) has announced that a phase 1 trial has begun for a novel coronavirus immunization in Washington state.

Differential Diagnosis

The symptoms of the early stages of the disease are nonspecific. Differential diagnosis should include the possibility of a wide range of infectious and non-infectious (e.g., vasculitis, dermatomyositis) common respiratory disorders.

- Adenovirus
- Influenza
- Human metapneumovirus (HmPV)
- Parainfluenza
- Respiratory syncytial virus (RSV)
- Rhinovirus (common cold)

For suspected cases, rapid antigen detection, and other investigations should be adopted for evaluating common respiratory pathogens and non-infectious conditions.

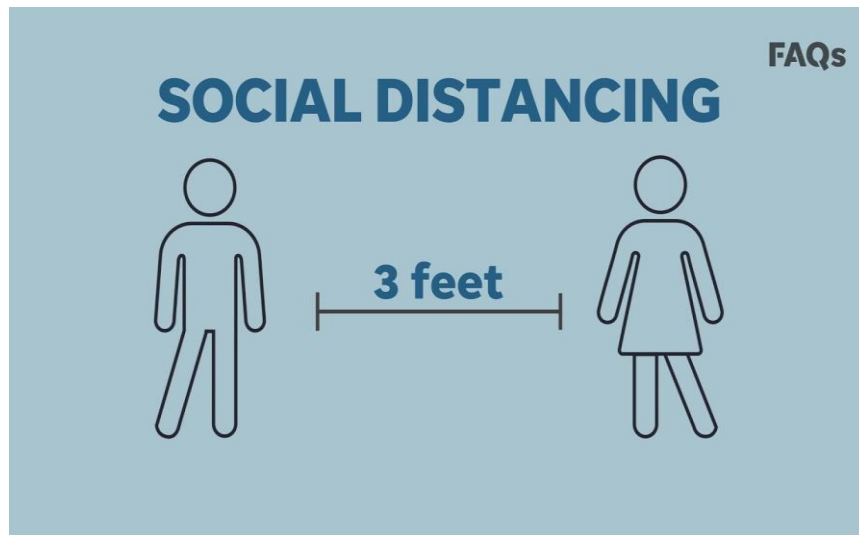
Deterrence and Patient Education

Patients and families should receive instruction to:

- Avoid close contact with subjects suffering from acute respiratory infections.
- Wash their hands frequently, especially after contact with sick people or their environment.
- Avoid unprotected contact with farm or wild animals.
- People with symptoms of acute airway infection should keep their distance, cover coughs or sneezes with disposable tissues or clothes and wash their hands.
- Immunocompromised patients should avoid public exposure and public gatherings. If an immunocompromised individual must be in a closed space with multiple individuals present, such as a meeting in a small room; masks, gloves, and personal hygiene with antiseptic soap should be undertaken by those in close contact with the individual. In addition, prior room cleaning with antiseptic agents should be undertaken and performed before exposure. However, considering the danger involved to these individuals, exposure should be avoided unless a meeting, group event, etc. is a true emergency.
- Strict personal hygiene measures are necessary for the prevention and control of this infection.



SOCIAL DISTANCING



Social distancing, also called “physical distancing,” means keeping space between yourself and other people outside of your home. To practice social or physical distancing:

- Stay at least 6 feet (2 meters) from other people
- Do not gather in groups
- Stay out of crowded places and avoid mass gatherings

COVID-19 spreads mainly among people who are in close contact (within about 6 feet) for a prolonged period. Spread happens when an infected person coughs, sneezes, or talks, and droplets from their mouth or nose are launched into the air and land in the mouths or noses of people nearby. The droplets can also be inhaled into the lungs. Recent studies indicate that people who are infected but do not have symptoms likely also play a role in the spread of COVID-19.

DIFFERENCE BETWEEN QUARANTINE AND ISOLATION

Quarantine

Quarantine is used to keep someone who *might* have been exposed to COVID-19 away from others. Someone in self-quarantine stays separated from others, and they limit movement outside of their home or current place. A person may have been exposed to the virus without knowing it (for example, when traveling or out in the community), or they could have the virus without feeling symptoms. Quarantine helps limit further spread of COVID-19.

Isolation

Isolation is used to separate sick people from healthy people. People who are in isolation should stay home. In the home, anyone sick should separate themselves from others by staying in a specific “sick” bedroom or space and using a different bathroom (if possible)^[17].

CURRENT SITUATION IN INDIA

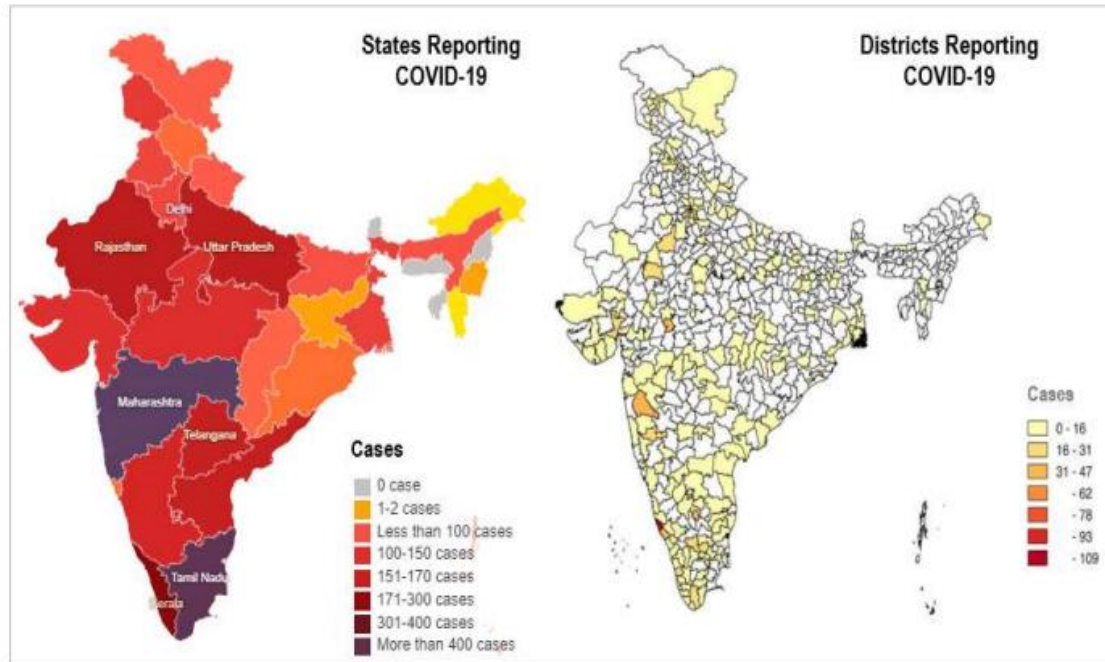
As of 5 April 2020 (18:00 PM), according to MoHFW, a total of 3577 COVID19 cases, (including 65 foreign nationals) have been reported in 29 states/union territories. These include 274 who have been cured/discharged, 1 who has migrated and 83 deaths ^[18].

INDIA SITUATION

- As of 5 April 2020 (18:00 PM), according to MoHFW, a total of 3577 COVID-19 cases, (including 65 foreign nationals) have been reported in 29 states/union territories. These include 274 who have been cured/discharged, 1 who has migrated and 83 deaths. Available [here](#).

WHO RISK ASSESSMENT

Globally - Very High



CONCLUSION

The emergence of new, infectious, global threats in the past 4 decades (e.g. AIDS, avian influenza A/H5N1 and SARS) has reshaped thinking at both national and international levels on the nature and level of public health responses needed for these threats^[19]. The year 2020 has started with a rapid, global epidemic of the virus SARS-CoV-2, causing the disease COVID-19. The virus appears to have transmitted to humans in a zoonotic event from bats. In this stage of lack of effective drugs, the implementation of infection control interventions and traffic control bundle to effectively limit droplet, contact, and fomite transmission is the only way to slow the spread of the SARS-CoV-2^[20,21]. This review provides updated information about COVID-19 SARS-CoV-2 can affect patients of all ages. Currently, effective infection control intervention is the only way to prevent the spread of SARS-CoV-2.

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