



Coronavirus Disease 2019 (COVID-19) Pandemic- An Update

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Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2, previously known as novel coronavirus or 2019-nCoV) is a viral zoonotic disease that emerged from China at the end of 2019 and is now a major public health issue. As of 23 March, 2020, data from the World Health Organization (WHO) have shown that more than 292,142 confirmed cases and 12,784 deaths have been recorded in 187 countries/regions, with 45% of cases being detected in Italy followed by Spain (14%) and France (11%). Although control measures in China have reduced new cases by more than 90%, this is not true in the case of Italy. Accordingly, from 30 January 2020 onwards, the WHO declared COVID-19 as the sixth public health emergency of international concern. Based on evidences, microdroplets and direct contact are the main means of transmission between humans. The infection has a mean incubation period of ranging to 6.4 days. Fever, Cough, dyspnea, and fatigue are the most common symptom of the patients. Reports also indicated that underlying diseases such as cardiovascular disease, hypertension, and diabetes mellitus further precipitating the condition and more mortality cases were recorded. Even though there is no effective treatment against COVID-19, remdesivir, lopinavir/ritonavir, nucleoside analogues, neuraminidase inhibitors, umifenovir, DNA synthesis inhibitors (tenofovir, disoproxil, and lamivudine), and chloroquine have been proposed as a potential drug options for COVID-19. Currently, controlling infection to prevent the spread of SARS-CoV-2 is the primary intervention being used. Therefore, close monitoring of the situation and a coordinated global response is desperately needed to prepare health systems to meet this unprecedented challenge.

Introduction

Coronaviruses are enveloped non-segmented positive-sense RNA viruses belonging to the family Coronaviridae and the order Nidovirales and broadly distributed in humans and other mammals. It causes illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). A novel coronavirus (nCoV) is a new strain that has not been previously identified in humans [1-3]. Moreover, the spread of coronavirus disease 2019 (COVID-19) is becoming unstoppable and has already reached the necessary epidemiological criteria for it to be declared a pandemic, having infected more than 292,142 people in 187 countries [4].

The COVID-19 pandemic is the defining global health crisis of our time. Since its emergence late last year, the virus has spread to every continent except Antarctica [5]. In December, a series of pneumonia cases of unknown cause emerged in Wuhan, Hubei, China, with clinical presentations greatly resembling viral pneumonia [6]. This was named as a novel coronavirus disease (COVID-19; also known as 2019-nCoV) by World Health Organization (WHO) on 11 February 2020 after deep sequencing analysis from lower respiratory tract samples [4, 6, 7].

In general, COVID-19 is an acute resolved disease but it can also be deadly. Severe disease onset might result in death due to massive alveolar damage and progressive respiratory failure [6, 8]. According to WHO, 2019-nCoV has affected

292,142 patients in 187 countries/regions and 12,784 were dead from the total cases till March 21, 2020. Thus, the disease has become a major global health concern worldwide. Interestingly, about 89,044 peoples have recovered from COVID-19. Recently, the incidence of COVID-19 cases was high in Italy (45%), Spain (14%), and other European countries (30%) [9].

The incidence of new cases are rising daily in Africa and South America, and Europe has taken over as the epicenter of the disease and more cases are now being reported every day than in China at the height of its epidemic. Countries are racing to slow the spread of the disease by testing and treating patients, carrying out contact tracing, limiting travel, quarantining citizens, and canceling large gatherings such as sporting events, concerts, and schools. The pandemic is moving like a wave-one that may yet crash on those least able to cope [10].

Globally, COVID-19 is much more than a health crisis since it poses great stress on every country it touches. Besides, it has the potential to create devastating social, economic and political crises that will leave deep scars. Dozens of the world’s greatest cities are deserted as people stay indoors, either by choice or by government order. Across the world, shops, theatres, restaurants, and bars are closing. Every day, people are losing jobs and income, with no way of knowing when normality will return. Small island nations, heavily dependent on tourism, have empty hotels and deserted beaches. The International Labour Organization estimates that 25 million jobs could be lost [10, 11].

Recent reports demonstrated, most cases of COVID-19 infection were transmitted through a human-to-human transmission of SARS-CoV-2 through droplets or direct contact [5, 12-14] and hospital-related transmission of SARS-

CoV-2 in 41% of patients in China [15]. Even though early studies reported SARS-CoV was transmitted from civet cats to humans. Besides, a link between a single local fish and wild animal market as well as animal-to-human transmissions are considered as a means of transmission for the infection [16, 17].

Even though there are no published reports on autopsies or lung tissue samples of patients with SARS-CoV-2, there some imaging reports that are recently released. Based on imaging studies and what we know of SARS-CoV and MERS-CoV, patients with the most severe disease will likely show diffuse alveolar damage with hyaline membrane formation, inflammation in the alveolar walls, desquamation of pneumocytes, and, if the case is complicated by a secondary bacterial pneumonia, intra-alveolar inflammatory infiltrate by neutrophils. Any other specific features, such as multinucleated cells or potential viral inclusions, remain to be discovered through pathologic studies of patients with this new virus [18].

According to a recent investigations, there are different explanations given for the rapidly increasing incidence of COVID-19 throughout the world, the possibility of transmission by asymptomatic carriers [3, 19] and its effective transmission of SARS-CoV-2 among humans [1, 14]. Recent evidences showed that global travel across different countries further enhances the worldwide spread of SARS-CoV-2 [20]. The WHO declared that the COVID-19 outbreak as a global threat and the sixth public health emergency of international concern on 30 January 2020, following H1N1 (2009), polio (2014), Ebola in West Africa (2014), Zika (2016) and Ebola in the Democratic Republic of Congo (2019). Hence, solidarity among all health workers, governments and the public is the most important strategy to prevent its spread [13, 14].

Region	Confirmed Cases	Deaths
European Region	151,293	7,426
Western Pacific Region	94,787	3,438
Eastern Mediterranean Region	23,669	1,596
Region of the Americas	19,685	252
South-East Asia Region	1,257	45
African Region	739	20
Globally	292,142	12,784

Table 1: The status of SARS-CoV-2 (COVID-19) on the globe, WHO report March 23, 2020.

Causes and Predisposing Factors

It's unclear exactly how contagious the new coronavirus is. It appears to spread from person to person among those in close contact. It may be spread by respiratory droplets released when someone with the virus coughs or sneezes. It may also be spread if a person touches a surface with the virus on it and then touches his or her mouth, nose or eyes. Recent travel from or residence in an area with ongoing community spread of COVID-19 as determined by CDC or WHO. Close contact

with someone who has COVID-19 such as when a family member or health care worker takes care of an infected person [8, 9].

According to different reports, there are different risk factors for COVID-19 that appear to include concurrent infection and peoples above that causes the immune system to be depressed. Among adult patients, cardiovascular disease and hypertension were the most common underlying diseases, followed by diabetes mellitus, cancer, and smokers.

Complications such as pneumonia in both lungs, organ failure in several organs and death due to this were observed [14].

According to recent studies, Italy has had 12,462 confirmed cases according to the Istituto Superiore di Sanità as of March 11, and 827 deaths. Only China has recorded more deaths due to this COVID-19 outbreak. The mean age of those who died in Italy was 81 years and more than two-thirds of these patients had diabetes, cardiovascular diseases, or cancer, or were former smokers. It is, therefore, true that these patients had underlying health conditions, but it is also worth noting that they had acute respiratory distress syndrome (ARDS) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pneumonia, needed respiratory support, and would not have died otherwise. Of the patients who died, 42.2% were aged 80–89 years, 32.4% were aged 70–79 years, 8.4% were aged 60–69 years, and 2.8% were aged 50–59 years (those aged >90 years made up 14.1%). The male to female ratio is 80% to 20% with an older median age for women (83.4 years for women vs 79.9 years for men) [6, 21].

Transmission of Virus

There is much to learn about the novel coronavirus that causes coronavirus disease 2019 (COVID-19). Based on what is currently known about the novel coronavirus and similar coronaviruses that cause SARS and MERS, spread from person-to-person with these viruses happens most frequently among close contacts (within about 6 feet). This type of transmission occurs via respiratory droplets. On the other hand, the transmission of novel coronavirus to persons from surfaces contaminated with the virus has not been

documented. Transmission of coronavirus occurs much more commonly through respiratory droplets than through fomites. Current evidence suggests that novel coronavirus may remain viable for hours to days on surfaces made from a variety of materials. Cleaning of visibly dirty surfaces followed by disinfection is a best practice measure for the prevention of COVID-19 and other viral respiratory illnesses in households and community settings [22, 14].

Symptoms: What differ COVID-19 from Common cold and Flu?

According to recent evidence and experience, the signs and symptoms of COVID-19 may appear two to 14 days after exposure and the common signs of infection include fever, cough, shortness of breath or difficulty breathing are the most frequently observed signs. In more severe cases, the infection can cause pneumonia, severe acute respiratory syndrome, kidney failure, and even death. Additionally, tiredness, aches, runny nose, and sore throat are other symptoms observed in infected peoples [4].

Reported illnesses have ranged from mild symptoms to severe illness and death for confirmed coronavirus disease 2019 (COVID-19) cases. However, based on some people even have no symptoms of the infection. People who are older or have existing chronic medical conditions, such as heart or lung disease or diabetes, may be at higher risk of serious illness. This is similar to what is seen with other respiratory illnesses, such as influenza (flu) and common cold [8, 9]. Thus, the difference in the clinical symptoms between coronavirus (COVID-19), flu and common cold were discussed in (Table 1).

Symptoms	Coronavirus (COVID-19) (symptoms range from mild to severe)	Cold (gradual onset of symptoms)	Flu (abrupt onset symptom)
Fever	Common	Rare	Common
Fatigue	Sometimes	Sometimes	Common
Cough	Common (usually dry)	Mild	Common (usually dry)
Sneezing	No	Common	No
Aches and pains	Sometimes	Common	Common
Runny or stuffy nose	Rare	Common	Sometimes
Sore throat	Sometimes	Common	Sometimes
Diarrhea	Rare	No	Sometimes for children
Headaches	Sometimes	Rare	Common
Shortness of breath	Common	No	No

Source: WHO and CDC, 2020

Table 1: Clinical symptoms between coronavirus (COVID-19), flu and common cold.

Precautionary Efforts

Most of the measures are symptomatic, although some antiviral medications have been used. The WHO also has a webpage with guidance regarding multiple aspects, including surveillance, patient management, and laboratory testing specific for SARS-CoV-2.6. Once a patient has been defined

as infected with SARS-CoV-2, he or she should be treated, taking into consideration airborne and contact precautions [1, 9]. Standard recommendations to prevent infection spread include regular hand washing, covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs. Avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing [8].

WHO's recommendations and guidelines to prevent the COVID pandemic includes:

- **Stay Home:** People who are mildly ill with COVID-19 can recover at home. Do not leave, except to get medical care. Do not visit public areas.
- **Stay in Touch With Your Doctor.** Call before you get medical care. Be sure to get care if you feel worse or you think it is an emergency.
- **Practice Social Distancing** with self-quarantine as much as possible. Social distancing will help slow the rate of infection. If you must go out for necessary errands such as groceries or healthcare, maintain a distance of 3 feet (1 meter) from others.
- **Avoid Public Transportation:** Avoid using public transportation, ride-sharing, or taxis.
- Repeatedly washing your hands with soap and water, frequently and for 20 seconds at a time.
- **Stay Hydrated** to alleviate sore throat and help general body function.
- **Disinfect your hand** with alcohol-based hand sanitizer every 20 minutes
- Carry clean napkins and paper towels to use when opening doors. Dispose of the napkins immediately after using them in the appropriate place, and wash your hands.
- **Limit Contact With Pets & Animals:** You should restrict contact with pets and other animals, just like you would around other people.
- Although there have not been reports of pets or other animals becoming sick with COVID-19, it is still recommended that people with the virus limit contact with animals until more information is known.
- When possible, have another member of your household care for your animals while you are sick with COVID-19. If you must care for your pet or be around animals while you are sick, wash your hands before and after you interact with them.
- Clean your phone, keys, steering wheel, keyboard, appliance handles, and doorknobs frequently with rubbing alcohol.

Practice social solidarity at the same time. Illness while living alone is a major public health problem for all adults. If you live alone, connect with others via phone or social media messaging specifically to let them know you are all right or if you need help, and that they can contact you if they need assistance as well. Conversely, reach out to those who live alone, of all ages but particularly those who are elderly, who are at greater risk.

Remember: racism has no place. Many Asian-Americans have been attacked or had their businesses go under due to the avoidance of those who blame them for COVID-19. This includes patients refusing to see an Asian-American doctor. One-quarter of US doctors and one-fifth of US nurses are foreign-born, often from Asia. Outside of China, Italy is the worst affected epicenter of COVID-19 yet Italian-Americans

do not experience the same level of racism in the United States.

Current and Potential Treatment Option against COVID-19

According to recent reports, more than 85% of patients received antiviral agents, including oseltamivir (75 mg every 12 h orally), ganciclovir (0.25 g every 12 h intravenously) and lopinavir/ritonavir tablets (40 0/10 0 mg twice daily orally). Empirical antibiotics were prescribed for 90% of patients in three reports [6, 12, 15] and according to one study 15 patients (15%) received antifungal agents. Five cases (5.1%) of bacterial (1) or *Candida* (4) co-infections were reported among 99 patients in one study [12], and 4 cases (9.8%) of secondary bacterial infections were reported in another study of 41 patients [6]. Although intravenous immunoglobulin and systemic steroids have been used in several reports, their efficacy and associated adverse effects remain unclear. So far, there has been no effective treatment of COVID-19 [6, 14, 15].

Several potential drugs including lopinavir/ritonavir (Kaletra ®), nucleoside analogues, neuraminidase inhibitors, remdesivir, umifenovir (Arbidol ®), DNA synthesis inhibitors (such as tenofovir disoproxil and lamivudine), chloroquine and Chinese traditional medicines (such as ShuFeng JieDu or Lianhua Qing- wen capsules), have been proposed [23]. Besides, an angiotensin-converting enzyme 2 (ACE2)-based peptide, 3CLpro inhibitors (3CLpro-1) and a novel vinyl sulfone protease inhibitor, theoretically, appear to show potential for antiviral activity against SARS-CoV-2 [24]. Chloroquine has *in vitro* effects on inhibition of uncoating and/or alteration of post-translational modifications of newly synthesized proteins, especially inhibition of glycosylation in many viruses, including human immunodeficiency virus (HIV) [14].

Preliminary *in vivo* clinical studies suggest that chloroquine alone or in combination with antiretroviral agents might play an interesting role in treating HIV infection [14]. A recent study by Wang et al. revealed that remdesivir and chloroquine were highly effective in the control of 2019-nCoV *in vitro* [23]. In addition to the one case of SARS- CoV-2 pneumonia with a promising clinical response to remdesivir and two clinical trials in China, further case-controlled clinical studies of remdesivir therapy are warranted to verify its therapeutic efficacy [14].

Status of Vaccine Trial against COVID-19

The first vaccine trial has begun just 60 days after the genetic sequence of the virus was shared by China. This is an incredible achievement. To ensure clear evidence of which treatments are most effective, WHO and its partners are organizing a large international study, called the Solidarity Trial, in many countries to compare different treatments.

Conclusions

The outbreak of COVID-19 has become a clinical threat to the general population and healthcare workers worldwide. However, knowledge about this novel virus remains limited. The effective option of antiviral therapy and vaccination are currently under evaluation and development. What we can do now is aggressively implement infection control measures to prevent the spread of SARS-CoV-2 via human-to-human transmission. Thus, A global response to prepare health systems worldwide is imperative. Besides, public health authorities should keep monitoring the situation, as the more we learn about this novel virus and its associated outbreaks, the better we can respond.

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