



(REVIEW ARTICLE)



## COVID-19: A pandemic

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### Abstract

Coronavirus belong to the genus Coronavirus in the Coronaviridae, and they are enveloped, positive single-stranded large RNA viruses that infect humans, but also a wide range of animals. It has a tendency of high degree of mutation and clinical manifestation vary a lot. The objective of literature review was to summarize (COVID-19) epidemiology, transmission and basic preventive measures that can be adopted by a society to stop its spread.

**Keywords:** COVID-19; Coronavirus; RNA; Epidemiology

### 1. Introduction

On 31<sup>st</sup> December 2019, some cases having symptoms of pneumonia of unknown etiology were reported in Wuhan city, Hubei province in china as Wuhan is the most densely populated city in central china with a population more than 11 million [1]. The cases reported were somehow linked to sea food wholesale market also including poultry and some other species like bats, snakes, and marmots. All reported cases were having clinical symptoms of dry cough, dyspnea, fever and lungs infiltrates on their imaging.

Etiologic investigation of all reported cases to the hospital were having the clinical symptoms of dry cough, dyspnea, fever, and lungs infiltrates on their imaging. There was a common history of high-risk animal contact among these patients which has further strengthened the transmission of infection from animal to humans. On 30<sup>th</sup> January 2020, WHO emergency committee after thorough examination declared the Chinese outbreak to be a public health emergency of international concern posing a high risk to health globally [2].

Coronavirus belong to the genus Coronavirus in the Coronaviridae, and they are enveloped, positive single-stranded large RNA viruses that infect humans, but also a wide range of animals [3]. It has a high mutation tendency and they are zoonotic pathogens that are present in humans and in various animals and clinical features can range from asymptomatic to critical situation in which hospitalization is required in intensive care unit [2]. This novel strain of coronavirus belongs to the same family of viruses that causes severe acute respiratory syndrome (SARS) and Middle east respiratory syndrome (MERS).

Coronavirus, was initially named as (2019-nCoV) on 12<sup>th</sup> January 2020 by World Health Organization and then WHO officially named the disease as coronavirus disease 2019 (COVID19) & later on coronavirus study group (CSG) proposed to name the new coronavirus as SARS-CoV-2, both were issued on 11<sup>th</sup> February 2020 [4] surfaces [14].

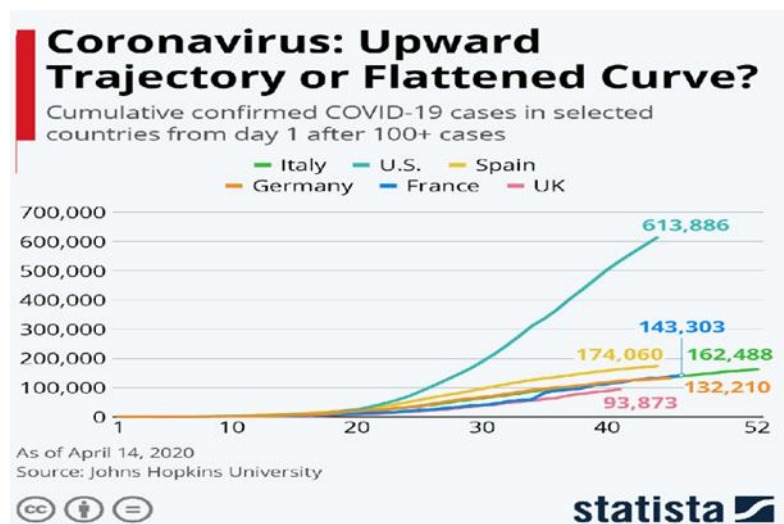
The objective of this review article is to compile basic preliminary scientific details about the disease, the ways it spread due to its high  $R_0$  value, and all the basic preventive measures which can be adapted by a society to break the chain of its spread.

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## 2. Epidemiology

In December 2019 an unknown acute respiratory tract infection broke out in Wuhan, China and all the reported cases were linked to Huanan seafood market, and the first case was officially declared on December 12<sup>th</sup>, 2019 and later on 27 viral cases of pneumonia with seven being severe were officially announced on December 31<sup>st</sup>, 2019 [5]. Several studies revealed that bat may be the potential reservoir of SARS-CoV-2. Genome sequencing of COVID-19 was analyzed throughout the genome to Bat CoV RaTG13 and showed 96.2% overall genome sequence identity suggesting that bat CoV and human SARS-CoV-2 share the same ancestor [6].

Like SARS this outbreak has occurred during the spring festival in China, and almost 3 billion people travel which made a perfect storm condition for the outbreak globally. As virus is highly contagious and human-to-human transmission can occur very easily between family members, friends, coworkers who are in contact with the patient or carrier [7]. It is reported that 31.3% of patients have travelled to Wuhan and 72.3% of patients contacting with people from Wuhan [8]. The estimated number of travelers during the 2020 spring festival has risen 1.7 folds when compared with the number traveled in 2003 and reached to 3.11 billion from 1.82 billion. This large-scale travel traffic has also created favorable conditions for the spread of this difficult-to-control disease [8].

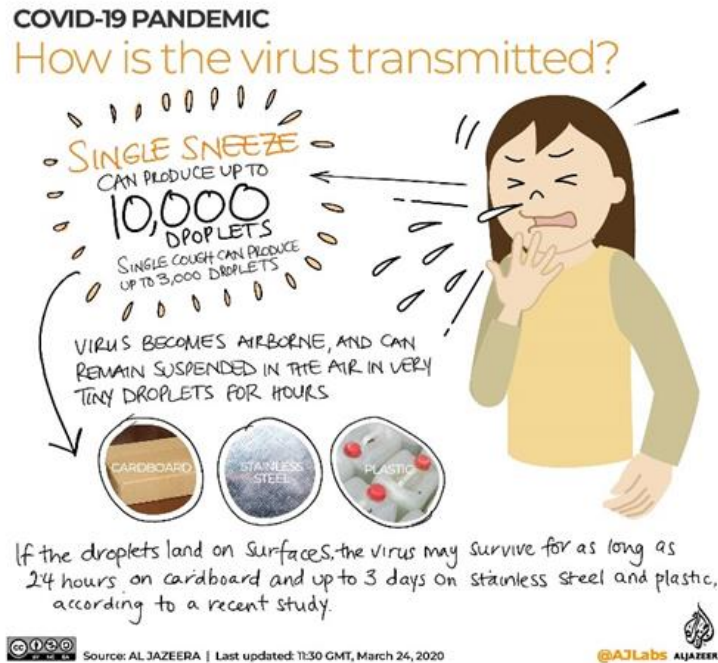


**Figure 1** Cumulative confirmed COVID-19 Cases. (John Hopkins University Resource centre, March 18, 2020) JHU.

## 3. Sources and transmission

CoVs is a large family of viruses that are common in many animal species like cats, camel, and bats. They have been so far defined as a novel respiratory virus which can lead from minor to severe respiratory tract infection. It has reported from study that novel virus causing pandemic coincides with CoV isolate from bats and the trade of wild animals in Huanan seafoods market where first case appeared supports the finding [9]. Secondary cases start reported approximately after ten days of primary outbreak and most of the people who were reported had no contact with that marketplace but were in contact with humans there. As like SARS AND MERS in past, human to human transmission occurred very swiftly and spread through travelers globally [10].

Centers for Disease Control and Prevention (CDC) have stated that SARS-CoV-2 is a respiratory virus and mainly transmitted between people through droplets when patient or carrier sneezes or coughs. Due to this droplet mode of transmission CDC recommended at least 6 feet of social distancing mechanism between individuals. This will make the droplets of 5 microns to fall on ground due to gravity within 6 feet from infected person. Apart from this there is another mode of transmission in which the millimicron particles carrying the virus emitted by infected person can drag in the surrounding air like aerosol and can infect passerby [6]. There is another route of transmission that also play a key role in transmission of COVID-19, is contact method in which viral particles emitted from the respiratory tract of an infected individual land on a surface then another person touches that object, and then touches their nose, mouth or eyes, this makes the virus to sneak into the body via mucous membrane and infecting the second person, the virus has incubation period of 1-14 days, mostly 3-7 days and is highly contagious during that period, and is highly transmissible especially in elderly people with underlying disease [11]. Human to human transmission of virus is presented in figure 2.



**Figure 2** Transmission of COVID-19 through droplet, aerosol, and contact (Source, AL Jazeera.com, March 24, 2020).

#### 4. Clinical symptoms and complications

The most common clinical symptoms in confirmed cases are fever (88.7%), cough (67.8%), fatigue (38.1%), sputum production, shortness of breath, sore throat and headache. Apart from this there are some patients with complaints of GI symptoms like diarrhea and vomiting but fever and cough are the dominant symptoms. The elderly people with underlying disorders like hypertension, diabetes, COPD, cancer can develop rapidly acute respiratory distress syndrome, septic shock, metabolic acidosis even leading to death [9]. Laboratory findings of most patients includes lymphocytopenia and in severe cases neutrophil count blood urea and creatinine levels were significantly high. Apart from this inflammatory factor (interleukin (IL)-6, IL-10, tumor necrosis factor - $\alpha$  (TNF- $\alpha$ ) increases indicating the immune status of patient [12].

**Table 1** Age and Fatality rate

Age (yrs.)	Case Fatality Rate (%)
80	14.8
70-79	8.0
60-69	3.6
50-59	1.3
40-49	0.4
30-39	0.2
20-29	0.2
10-19	0.2
0-9	None

**Table 2** Preexisting conditions and fatality rates.

<b>Pre Existing Conditions</b>	<b>Case Fatality Rate (%)</b>
Cardiovascular Diseases	10.5
Diabetes	7.3
Chronic respiratory disease	6.3
Hypertension	6.0
Cancer	5.6
No Pre-existing conditions	0.9

However, the complications include acute respiratory distress syndrome (ARDS), shock, acute kidney failure, acute cardiac injury, liver dysfunction and some secondary infections. There is 10-20% incidences of bacterial and fungal infections. These poor clinical outcomes are related to severity of disease which tends to progress faster in elderly people [13].

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## 5. Prevention

Currently there is no vaccine available as a new virus a lot need to be learned. General recommendation by CDC helps to stop the spread of virus and also to reduce the number of cases like travel restrictions, quarantines, school/work closings, social distancing, these are the basis preventive measures which can help to reduce the  $R_0$  (Contagiousness rate). Certain other measures like avoid sick individuals, wash hands with soap and water for at least 20 seconds before eating, after cough/sneeze or bathroom visits, social distancing at least 6 feet, mask when going out in public places, don't touch eyes and face, cover your sneeze and disinfect frequently touched surfaces [14].

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## 6. Conclusion

This review article summarizes all the basic epidemiology, sources and transmission and preventive measures that can be adapted by a society to stop the spread of COVID-19 a highly contagious virus with greater value of  $R_0$ . This article will benefit the community on a larger scale to understand how the spread chain can be stopped.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

There is No conflict of interest.

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