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Review Article

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## A new human coronavirus: a review

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### Abstract

Coronavirus has led to the infection of respiratory inclusive coughing, sneezing, cold conditions, and pneumonia disease, while in animals Coronavirus leads to diarrhea conditions and diseases of the respiratory system. COVID-19 has transfer man to other man or man to animal through droplets of airborne. This review was done to explain the epidemiology, pathophysiology conditions, prognosis, and future perspective of COVID-19. The infection of Human coronavirus (HCoV) leads to diseases of the respiratory system. HCoV spreads faster than SARS-CoV and MERS-CoV but has a lower death percent.

**Keywords** COVID-19, Virus-Host Interactions, SARS-CoV, Pathogenesis

### Introduction

In the end of 2019, COVID-19 comes out in Wuhan Hubei province, China (Zhu et al., 2019). Researches demonstrated that the infection of COVID-19 leads to groups of symptoms as severe acute respiratory syndrome coronavirus (SARS) (Zhu et al., 2019; Huang et al., 2020). The disease was first spread to infect 9720 people in Wuhan with 213 death cases up to January 31, 2020 (He et al., 2019). As of 14th Feb 2020, reported more than 60000 infect cases with more than 8000 persons infected with COVID-19, and over 1500 death cases. As well, infected persons have been reported in 25 countries universally (Chen et al., 2019; Li et al., 2020). COVID-19 is a zoonotic pathogen that is discovered in man and different animals with a range of clinical characterize from asymptomatic to infections including respiratory diseases, gastrointestinal diseases, hepatic diseases (Yin et al., 2018; Sahin et al., 2020). Until this time, no specific and active medical therapy. *In-vitro* researchers have referred that a drug called chloroquine, is effective in reducing the replication of viral (Savarino et al., 2003; Colson et al., 2019).

### Types Coronaviruses

Different types of coronaviruses (family: Coronaviridae) differ in mechanism of severe the disease becomes, and the way of

spread. Doctors distinguish seven coronavirus types that lead to infect man. The common types: alpha coronavirus (229E), type alpha ( $\alpha$ ) coronavirus (NL63), type beta ( $\beta$ ) coronavirus (OC43) and type beta ( $\beta$ ) coronavirus (HKU1). Uncommon strains which cause lead severe problems inclusive MERS-CoV, and SARS-CoV. In 2019, a serious strain known as SARSCoV-2 begin circulating, lead to COVID-19 disease (Unhale et al., 2020).

### Spreading Mode

Persons can get the infection via contact with a patient who has signs and symptoms from COVID-19 inclusive cough condition and sneezing. Generally, COVID-19 was spread through airborne droplets.

COVID-19 was replicated and duplicated in ciliated columnar epithelium that leads to damage in cells and infection. According to a study issued in 2019, a giotensin converting enzyme 2 (ACE.2), a exopeptidase in the receptor of cell membrane utilized by COVID-19 in entry to man cells (de Souza et al. 2007;Woo et al.,2009; Letko & Munster 2020). Virus transport and transmission was shown in Fig.1

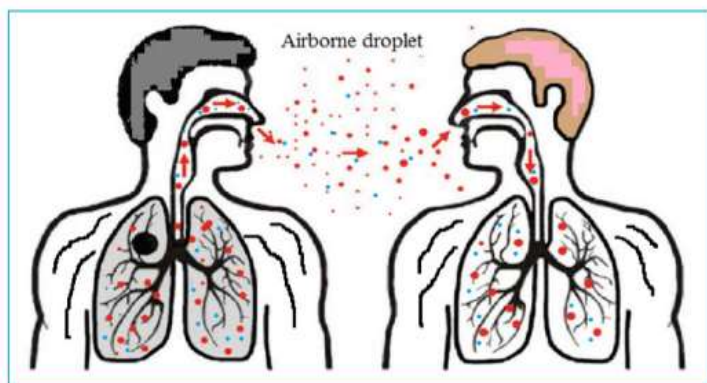


Fig. 1 Transmission of corona virus via airborne

A one-time cough can spread more than 3,000 droplets. The droplets can reach other people, and covering the surfaces around these people, however, some particles may stay within the air. The Covid-19 is also excreted through stool, thus the person who is not washing his hands could pollute anything they touch in the bathroom like different viruses respiratory system, like flu, Covid-19 can be transmitted by contact with small droplets emitted from infected persons with Covid-19, (Gray 2020) e.g. common cold or coughing condition from the nose and mouth (Ahmad et al., 2020). Covid-19 can be spread via pollution of the surface when droplets, that contain a virus, land on different surfaces around the man and other healthy persons touch these polluted surfaces, then touching their nose or mouth (Alaska, 2020). Transmission phenomena of COVID-19 show in Fig. 2

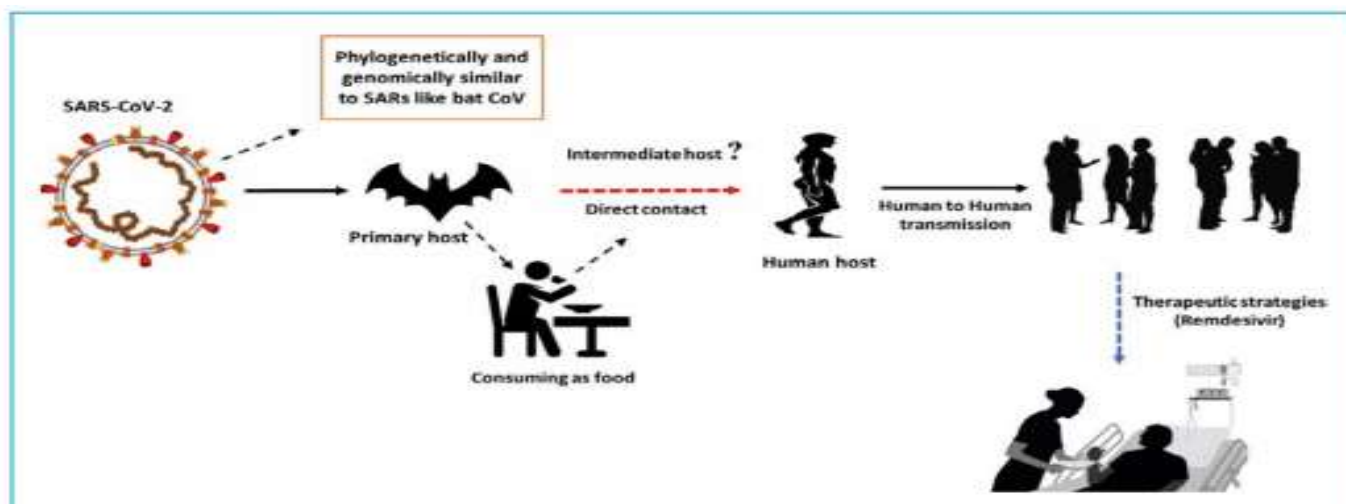


Fig. 2 Transmission of COVID-19 to human host

### Epidemiology and Pathogenesis

All human ages and both genders are susceptible to COVID-19 infection. The virus is spread via droplets released through coughing but can also happen from asymptomatic persons and before symptoms onset (Rothe et al., 2020). Researchers have demonstrated higher viral loads in the cavity of the nasal with no variance in the burden of viral between symptomatic and asymptomatic persons (Zou et al., 2020). Some infected persons may act like superspreaders (WHO, 2020). The infected droplets spread for 1–2 meters and precipitate on surfaces. Covid-19 can stay viable on different surfaces for some days in typical environment factors but are damaged in less than a minute by bactericide and antiseptic like ethanol, hydrogen peroxide, etc. (Kampf et al., 2020). Infection is transmitted by inhalation way of infected droplets or touching pollution surfaces by Covid-19 and then touching the sensor organs as the nose, oral cavity, and the eyes. Covid-19 is appearing in the feces and polluting the supply of water and transmission through fecal-oral route is supposed (Xu et al., 2020). Transmission of transplacental from pregnant to their embryo was not reported (Chen, 2020). The period of incubation different begins from 2 to 14 days.

Studies and research have identified ACE2 as the receptor via which Covid-19 enters the mucosa of the respiratory system. The basic case reproduction rate is assessed to range 2-6.47 in many modeling studies (Cheng & Shan, 2019).

### Immune response

The immune system of the host response to the infection of viral through inflammation and the activity of cellular anti-viral is preventing viral spreading. However, virus lytic effects on host cells with excessive immune responses together will outcome in pathogenesis. The various studies and research have demonstrated infected persons have different symptoms like pneumonia and cough (Lippi et al. 2020). Some infected persons progressed rapidly with Syndrome of Acute Respiratory Stress (ARDS) that was finally followed by many organs failure and approximately 10% of infected persons have died (Huang et al. 2020). Progression of ARDS and lung destruction in this virus infection are other indications that ACE2 may be a way of SARS-CoV-2 entry like ACE2 is recognized on ciliated columnar epithelium cells of the passages and the cells of alveolar in man (Chen et al. 2020).

Infected persons with SARS-CoV-2 are noted to have a significant increase in levels of interleukin-1 $\beta$ , interleukin-2, and interleukin-7, GSCF, MCP1, and TNF- $\alpha$  than healthy persons. Infected persons in the intensive care unit (ICU) have a significant increase in levels of GSCF, IP10, MCP1, and TNF- $\alpha$  than those non-ICU infected persons, referring that the cytokines might cause the severity of the disease. The cytokines of Anti-inflammatory include interleukin-10 and interleukin-4 was also elevated in those infected persons (Hamming et al., 2004). A similar trend was noted in SARS-CoV models whereas this virus was found more likely to infect the elderly than the young. More studies are important to distinguish SARS-CoV-2 host genes that permit the virus to cause disease, lead to death, in men (Wong et al., 2004; Huang et al., 2020; Lippi et al., 2020).

**Virus diagnosis**

For persons with suspicious infection, different techniques for prognosis COVID-19 infection are used: real-time fluorescence to reveal the positive for SARS-CoV-2 nucleic acid in patient's sputum and other secretions (Smits et al., 2010). In persons with this virus infection, the leukocyte count could vary. The lymphopenia condition, Leukopenia, and leukocytosis were reported (Lagier et al., 2020). Increased lactate dehydrogenase enzyme and levels of ferritin are prevalent, and increased aminotransferase enzyme levels also were described. Most infected persons who have pneumonia condition showing normal pro-calcitonin levels, in those requiring the care of ICU, they are more likely to be increased. High D-dimer levels are related to mortality. Also, some studies have referred that the abnormalities of CT are more likely to be bilateral and include lower lobes. Less common results comprise lymphadenopathy, and pleural effusion (Ai et al., 2020; Li et al., 2020; Bai et al., 2020). Chest Computed tomography (CT) may be useful in manufacture the prognosis, but no result could rule the probability of this virus. The specimen of oropharyngeal by using swab could be obtained; it must be placed in a container like the nasopharyngeal sample (Won et al., 2010). The sputum must be obtained from infected persons with the cough. A lower respiratory tract aspirate must be obtained from infected persons who are intubated. The Datapoint that the levels of nucleic acid (viral RNA) are more repeatedly reveal in nasal cavity compared with oral cavity samples. SARS-CoV-2 RNA is revealed by RT-PCR (Loeffelholz et al., 2020). A positive result for SARS-CoV-2 confirms the prognosis of COVID-19. The World Health Organization recommends Re-take samples from different respiratory system sites if the beginning testing presents negative although the suspiciousness for COVID-19 infection continues (WHO, 2019). Negative tests of RT-PCR on swabs of oropharyngeal despite CT results revealing of pneumonia was present in some infected persons who eventually positive result for SARS-CoV-2. The biochemical tests must be able to distinguish between infected persons who have the previous infection but negative results of PCR (Ling et al., 2020; Lim et al., 2020).

**Infection prevention**

According to the World Health Organization, several public guidelines were issued like isolated the infected person in a

single room from another family member, contact application and droplet caution, airborne caution, Avoid contact with infected persons, in particular, whose with cough condition. The visit is prohibited shops and places where the animals are located, Wash the hands by using the detergent before eating, after using the toilet and after any communication with anything, the contact is prohibited with animals or their wastes (ECCP 2010).

**Infection treatment**

No specific drug for the treatment of COVID-19, and there is no vaccine is available. Oxygen treatment represents the main therapy intervention for infected persons. Ventilation is important in respiratory failure cases (Chan et al., 2020). Various planning can be utilized according to the infected person's severity and the regional epidemiology (CARM 2020; Russell et al., 2020). The management at home is suitable for asymptomatic infect persons. They need to temperature estimate, oxygen saturation, the blood pressure for about 14 days. The major experiment of pharmacology options is summarized in Table 1.

**Table 1: COVID-19 pharmacological experimental options**

Glucocorticoids
Remdesivir Chloroquine and hydroxychloroquine
Tocilizumab drug
The drug called Lopinavir-ritonavir
Baraticinib drug
Angiotensin converting enzyme 2

**Conclusion**

Through this review, we conclude that the disease profile of COVID-19 is dynamic and continues to rapidly evolve. SARS had a rate of mortality that reached 9.5%, while COVID-19 appears to have a mortality rate of around 2%, based on confirmed cases number and deaths number.

**Authors' contributions**

Zainab Hasan Majeed and Ahmed Hamad Saleh have contributed significantly to the conception and design of the study, the interpretation of data, and the drafting and revision of the manuscript. All authors read and approved the final manuscript.

**Conflict of Interest**

The authors hereby declare no conflict of interest.

**Consent for publication**

The authors declare that the work has consent for publication.

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