

Novel Coronavirus: A Newly Arranged Mini-Review

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Abstract

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was originally known as a virus that infects animals and rarely can be transmitted to humans in large populations, is now transformed into one of the most feared pandemics causes worldwide. Infection by a virus that is officially known as COVID-19 has caused global concern mainly due to the number of deaths caused. Since it was first reported in Wuhan, China in December 2019, now COVID-19 has spread to almost all parts of the world with a very rapid spread rate. The main symptom of this infection is a respiratory disease accompanied by other symptoms that resemble flu-like illness. Everyone can suffer from COVID-19, but the elderly, toddlers, pregnant women, and people with certain diseases and disorders of the immune system show more severe symptoms. The disease is transmitted through inhalation or contact with droplets, where the incubation period ranges from 2 to 14 days. Until now, specific therapy to treat COVID-19 has not been found, with preventive measures taken to control its spread. In this mini-review, we will explain important information related to COVID-19.

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INTRODUCTION

Coronavirus is a spherical or pleomorphic enveloped particulate containing a single-stranded [positive sense] RNA associated with a capsid nucleoprotein consisting

of a matrix protein. The envelope carries a club-shaped glycoprotein projection. It belongs to the Phylum Pisuviricota, the Nidovirales order, the Coronaviridae family, and the Betacoronavirinae genera (Pal *et al.*, 2020).

Their viral RNA genome is 26 to 32 kilobases in length. It is a highly diffuse virus spread by droplets, direct contact, and contact with infected objects (Chen *et al.*, 2020). Coronavirus is a large family of viruses that can infect birds and mammals, including humans, according to the World Health Organization. The virus is responsible for causing severe acute respiratory syndrome (SARS) (Raoult *et al.*, 2020; Woo *et al.*, 2010).

On January 24th, 2020, at least 830 cases were diagnosed in nine countries: China, Thailand, Japan, South Korea, Singapore, Nepal, Vietnam, and Taiwan (Tan *et al.*, 2020). And by the end of December 2019, a virus from a similar family group had re-emerged in Wuhan and had even become a global pandemic (Mackenzie & Smith, 2020). The virus was officially named 2019 novel coronavirus (2019-nCoV) and is also known as SARS-CoV-2 (Wang *et al.*, 2020). Therapies that have proven to be particularly effective in the treatment of SARS-CoV-2 infection, known as coronavirus disease 2019 (COVID-19), have not yet been identified and are still being extensively studied by scientists around the world (Yi *et al.*, 2020).

In this mini-review, we will discuss all kinds of ins and outs related to SARS-CoV-2 along with the COVID-19 outbreak that threatens all human beings in the world, starting with the classification and transmission of SARS-CoV-2, diagnosis, symptoms, management, and prevention of COVID-19. The whole discussion will be presented with a new perspective, with actual and relevant references.

CORONAVIRUS CLASSIFICATION

The classification of SARS-CoV-2 is shown in Figure 1. In general, SARS-CoV-2 has the same beta coronavirus genera as SARS-CoV which causes SARS and MERS-CoV which causes MERS. However, the lineage/strain difference causes SARS-CoV-2 to show more pathogenicity than both (Pal *et al.*, 2020). Besides, there are

also several species of coronavirus that specifically infect humans, including Human coronavirus 229E (HCoV-229E), Human coronavirus NL63 (HCoV-NL63), Human coronavirus OC43 (HCoV-OC43), and Human coronavirus HKU1 (HCoV-N43) (Liu *et al.*, 2020).

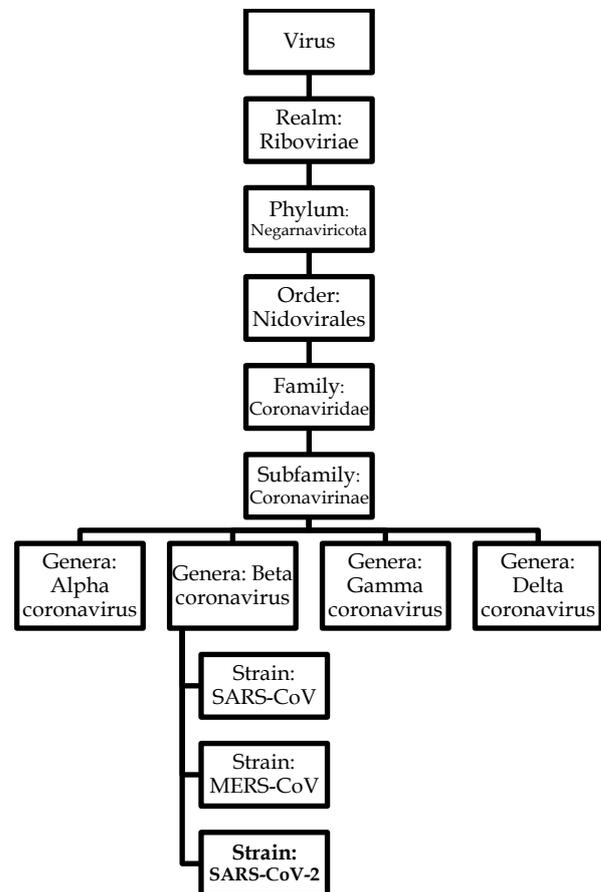


Figure 1. Classification and origins of SARS-CoV-2 (Pal *et al.*, 2020)

COVID-19 TRANSMISSION

COVID-19 is transmitted through droplets from the physiological fluids of infected individuals and can be transmitted with various droplet sizes when the droplet particle size is $> 5-10 \mu\text{m}$, the other droplets are transmitted through the respiratory tract, and when the droplet particles are $< 5 \mu\text{m}$ in diameter, they are referred to as the core droplets (Atkinson *et al.*, 2009). According to current evidence, COVID-19 is mainly transmitted between people via respiratory droplets and direct contact routes. Droplet transmission occurs when a

person is in close contact with a radius of 1 m with someone who has symptoms of respiratory distress, where the individual is at risk of inhaling droplets and is exposed to oral/nasal mucosa or eye conjunctiva and is also exposed to SARS-CoV-2 (Wilson *et al.*, 2020). Transmission can also occur through fomites in the immediate vicinity of infected people (Huang *et al.*, 2020). Some types of coronavirus that infect animals such as cat coronavirus (FeCoV) may spread through contact with the face. However, it is not clear whether this also applies to humans (Weiss & Navas-Martin, 2005).

COVID-19 DIAGNOSIS

The U.S. CDC has developed criteria for persons under investigation (PUIs). If a person is considered to be a PUI, immediate prevention, infection, and control measures shall be taken. Epidemiological factors are used to assess the test requirement. These include close contact with a laboratory-confirmed patient with 14 days of symptoms or a history of travel to the infected area within 14 days of onset on symptoms (Ghinai *et al.*, 2020; Yin & Wunderink, 2018).

Chest X-rays (CXRs) usually show bilateral infiltration but may be normal in early illness. Computed Tomography (CT) is more sensitive and more specific. The CT imagery generally shows infiltrates, ground opacities, and sub-segmental consolidation. It is also abnormal in asymptomatic patients who have no clinical evidence of lower respiratory tract involvement. Abnormal CT scans were used to diagnose COVID-19 in suspected cases with a negative molecular diagnosis; many of these patients had positive re-test molecular tests (Cascella *et al.*, 2020).

COVID-19 SYMPTOMS

In general, the signs and symptoms are shown in people suffering from COVID-19 almost resemble the

symptoms that are shown in cases of other viral infections such as fever, dry cough, and muscle aches (Singhal, 2020). Therefore, people often do not realize that they are infected with COVID-19 because they feel that they have other diseases. Some patients show no clinical symptoms at all (Raoult *et al.*, 2020; Cascella *et al.*, 2020). However, of the majority of cases that occur, it is reported that people who are infected show symptoms of flu-like illness, such as:

Most common

1. Fever
2. Dry cough
3. Tiredness

Less common

1. Muscle aches
2. Sore throat
3. Diarrhea
4. Conjunctivitis
5. Headache
6. Loss of taste or smell
7. Rash on skin

From these symptoms, some people show severe symptoms and require immediate medical attention, including:

1. Shortness of breath
2. Chest pain
3. Difficulty in communication

It takes 5–6 days, on average, to have symptoms from someone infected by the virus, but it may take up to 14 days (World Health Organization, 2020a).

COVID-19 MANAGEMENT

As of the end of May 2020 at the time this article was written, effective treatments to cure COVID-19 infections have not yet been found. Various pharmaceutical companies and research groups are still developing vaccines and repurposing drug compounds to find the

most effective and optimal treatment for COVID-19 (Amawi *et al.*, 2020; Savi *et al.*, 2020; Wu *et al.*, 2020). The management of COVID-19 patients is prioritized based on the condition of each patient, where patients who have only mild symptoms or no symptoms at all are recommended to improve the body's immune system and treat the mild symptoms that arise (Ali & Alharbi, 2020). While in patients with medium and severe conditions, also given supportive therapy such as administration of antipyretic and analgesic, maintenance of hydration, and administration of oxygen. Medical therapy involving corticosteroids and antivirals has also been encouraged as part of critical management schemes. However, there is currently no specific antiviral recommended for the treatment of COVID-19 (Nicola *et al.*, 2020). In patients with COVID-19 with severe conditions and experiencing acute respiratory distress syndrome (ARDS), the use of a ventilator as a respiratory aid is mandatory and crucial. However, not all health facility units have sufficient ventilators, while ventilators that are used incorrectly can increase the patient's mortality rate (Iyengar *et al.*, 2020; Möhlenkamp & Thiele, 2020).

COVID-19 PREVENTION

In addition to using masks and face shields, prevention of transmission of COVID-19 is done by maintaining a safe distance between people to avoid direct contact with droplets that may contain viruses (Perencevich *et al.*, 2020). Washing your hands as often as possible using soap and running water is also mandatory, and if not available, it can be replaced with alcohol-based hand sanitizers. Equally important is avoiding traveling to a place where it is crowded with people (Jayaweera *et al.*, 2020). Some ways to prevent the spread of COVID-19 as summarized by the World Health Organization (2020b) include:

1. Clean your hands up often. Use soap and water, or rub a hand based on alcohol.
2. Keep a safe distance from anyone who's coughing or sneezing.
3. Don't touch your eyes, your nose, or your mouth.
4. If you cough or sneeze, cover your nose and mouth with your bent elbow or tissue.
5. Stay at home if you feel uneasy.
6. If you have fever, cough, or difficulty breathing, seek medical attention. Please call in advance.
7. Follow the instructions of your local health authority.

CONCLUSION

Findings show that large portions of the study participant are aware and knowledgeable about COVID-19 and its presence in Nigeria. Results obtained from the research questions regarding knowledge of COVID-19 in terms of respondents' knowledge of the source, transmission, symptoms, preventive behavior, the fatality rate of the COVID-19, and the major resources of information about COVID-19 among north-central Nigerians were significantly high. A large portion of the study participant is scared of the COVID-19 pandemic and its outbreak in Nigeria this may be a result of the high rate of a fatality caused by this pandemic worldwide. This could imply that the respondents apprehend about COVID-19. The knowledge on COVID-19 could, therefore, support a better capacity to adopt precautionary measures leading to the control of the disease as was in the case of ebola.

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