# THE EMERGENICE OF COVID -19 PANDEMIC IN THREATENING THE WORLD IN THE 21 CENTURY


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## LIST OF ABBREVIATIONS

WHO: World Health Organization

ICTV: International Committee on Taxonomy of Viruses

USA: United State of America

MERS: Middle East Resparatory Syndrome

SARS: Severe Acute Respiratory Syndrome

***ABSTRACT***

*The COVID-19 pandemic is considered as the most crucial global health calamity of the century and the greatest challenge that the humankind faced since the 2nd World War. In December2019, a new infectious respiratory disease emerged in Wuhan, Hubei province, China and was named by the World Health Organization as COVID-19 (coronavirus disease 2019. For transmission from animals to humans, direct contact with the intermediary host might be one Route. According to the report of the World Health Organization (WHO as of April 18 2020), the current outbreak of COVID-19, has affected over 2164111 people and killed more than 146,198 people in more than 200 countries throughout the world. Till now there is no report of any clinically approved antiviral drugs or vaccines that are effective against COVID-19. The coronavirus outbreak is severely disrupting the global economy. Almost all the nations are struggling to slow down the transmission of the disease by testing & treating patients, quarantining suspected persons through contact tracing, restricting large gatherings, maintaining complete or partial lock down etc. In this review,We focus on our current understanding of the epidemiology, pathogenesis, Immune response of COVID-19, as well as working mechanism of virus.also describes the emergence of COVID-19 threatening on society, healthy and the possible ways in which the disease can be controlled.*

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***Keywords: COVID-19, Pandemics, Global healthy.***

# 1. INTRODUCTION

## 1.1 Background

Pandemics in general are not merely serious public health concern, rather these trigger disastrous socio-economic and political crises in the infected countries. COVID-19, apart from becoming the greatest threat to global public health of the century is being considered as an indicator of inequity and deficiency of social advancement. A newly identified coronavirus, SARS-CoV-2, has caused a worldwide pandemic of respiratory illness, called COVID-19. As of now, researchers know that the new coronavirus is spread through droplets released into the air when an infected person coughs or sneezes. (Huang *et al.*, 2020). COVID-19 appeared in Wuhan, a city in China, in December 2019. Although health officials are still tracing the exact source of this new coronavirus, early hypotheses thought it may be linked to a seafood market in Wuhan, China. Some people who visited the market developed viral pneumonia caused by the new coronavirus. A study that came out on Jan. 25, 2020, notes that the individual with the first reported case became ill on Dec. 1, 2019, and had no link to the seafood market.(World Health Organization , 2020).

Since then, the disease rapidly circled the globe and has eventually affected every continent except Antarctica. It has been categorized as a pandemic by the World Health Organization International Committee on Taxonomy of Viruses (ICTV) named the virus as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Gorbalenya *et al*.,2020). These worldwide outbreaks triggered a large number of fatalities, morbidities, and cost billions of dollars(Fan *et al* ., 2019). Compared to other diseases and their respective burdens, COVID-19 is likely to cause as much or greater human suffering than other contagious diseases in the whole world. Therefore, healthcare personnel, governments and the public in general need to show solidarity and fight shoulder to shoulder for prevention and containment of the pandemic (Yoo ,2020). In this review paper, main focus is to highlight the biological prospective emergence of COVID-19 threatening or impacts on environment, healthy and ways of controlling.

## 2. LITERATURE REVIEW

### 2.1 Covid 19 pandemic

The outbreak of the new corona virus infection, COVID-19 was initiated from the Hunan seafood market in Wuhan city of China in December 2019, and within a couple of months it has turned out to be a global health emergency. Live animals like bat, frog, snake, bird, marmot and rabbit are frequently sold at the Hunan seafood market (Wang *et al.*,2020b). Genomic analysis revealed that SARS-CoV-2 is phylogenetically related to severe acute respiratory syndrome-like (SARS-like) bat viruses, bats could therefore be the possible primary source. Although the intermediate source of origin and transfer to humans is not clearly known. the rapid human to human spreading capability of this virus has been established. As per the latest update of WHO on 01 January 2021, the outbreak of COVID-19 had spread in more than 200 countries. Approximately 1,899,440 people had died after contracting the respiratory virus out of nearly 87,273,380 confirmed cases. (World Health Organization , 2020).

#### 2.1.1 A virus reported as pandemic so far

Since the Spanish flu emerged as a pandemic in 1918, many invisible viral enemies have threatened the world. Although each new virus is spread differently, causing different symptoms and with varying mortality rates, public health officials build on these experiences to fight the current COVID-19 pandemic. The H1N1 flu (swine flu) emerged in June 2009 in Mexico and spread globally through August 2010, when the World Health Organization declared the end of the pandemic. In that short time, there were 60.8 million cases affecting 24% of the global population (Hui, D.S. *et al.*, 2020). The mortality rate was 0.02% with 12,500 deaths patients( Rakasz & Lynch, 2002). One major difference between Ebola and COVID-19 is the method of spread.

Ebola is spread during the last stage of the disease through blood and sweat. In contrast, COVID-19 spreads more easily through breathing, coughing or talking in close contact. The H1N1 virus affected both children and adults. By the end of the H1N1 pandemic, 80 percent of deaths were people younger than 65. Undoubtedly, scientists will continue to

learn more about how COVID-19 stacks up against other viruses. Anthrax causes sudden death in cattle, sheep, and goats and can severely affect humans. Outbreaks of anthrax occur occasionally in certain areas of the United States, in 2001, anthrax was deliberately spread in the United States through letters containing a powder with anthrax spores.

## 2.2Covid 19 and global health

The relationship between human health and disease is neither a new concept nor a new subject. The emergence COVID-19 in China at the end of 2019 has caused a large global outbreak and is a major public health issue. This virus is highly infectious and can be transmitted through droplets and close contact. The human to the human spreading of the virus occurs due to close contact with an infected person exposed to coughing, sneezing, respiratory droplets or aerosols. These aerosols can penetrate the human body (respiratory system) via inhalation through nose or mouth (Phanet *et al*.,2020).

The clinical spectrum for individuals with COVID-19 infection ranges from mild or non-specific signs and symptoms of acute respiratory illness such as fever, cough, fatigue, shortness of breath, to severe pneumonia with respiratory failure and septic shock, which are very similar to other coronavirus diseases (Backer *et al.*,2020). Taking into consideration the quick and frantic spread of the epidemic, health of rheumatic patients is a matter of prime concern. COVID-19 being a respiratory disease, damage of the tissues of Lungs is quite obvious, but there is report that other organs and tissues may also be affected. Since viral shedding in plasma or serum is common in respiratory tract infections, there is a possibility of transmission of coronaviruses through the transfusion of labile blood products. COVID-19 is a major public health concern for the world's population and is a leading cause of hospitalization and death, particularly for middle and old age people in the affected countries.

## 2.3. Response of virus in terms of geographical, age and sex

While the virus can infect anyone regardless of age and sex, certain groups are at higher risk. These vulnerable groups include children, pregnant women, the elderly, healthcare providers, immune compromised individual and others with comorbidities such as asthma, diabetes and

heart diseases. A paradoxical situation between aging male and female is evident in particular regarding health status and the corresponding survival rates (Oksuzyan *et al*., 2008). Women exhibit significantly higher life expectancies, while frequently experiencing disabilities earlier in life (Van Oyen *et al*., 2013).

Independent of age, death rates due to cancer, heart disease, accidents, influenza, or pneumonia are significantly higher in men. In the UK, the risk of death is strongly associated with old age, lower socio-economic status, gender with male having higher risk and comorbidities (diabetes, obesity, cancer, respiratory diseases, heart, kidney, liver, neurological and autoimmune conditions).In a worldwide cross-sectional study analysing open access databases, mortality is associated with lower test number, lower government effectiveness, ageing population, fewer hospital beds and poor transport infrastructure.

### 2.4.Working mechanism of RNA virus

RNA viruses typically have high mutation rates due to lack of proofreading activity, which promotes viral genetic diversity and increases their adaptive potential. RNA viruses need to use the cellular machinery of the organisms they infect to make copies of themselves. However, infection by a retrovirus requires an additional step. The Retroviruses use reverse transcriptase to transform their single-stranded RNA into double-stranded DNA. It is DNA that stores the genome of human cells and cells from other higher life forms. Once transformed from RNA to DNA, the viral DNA can be integrated into the genome of the infected cells. When the DNA versions of the retroviral genes have been incorporated into the genome, the cell then is tricked into copying those genes as part of its normal replication process( Rakasz & Lynch, 2002). In other words, the cell does the work of the virus for it.First, the viral RNA is transformed into DNA. Then the cell can copy the DNA. The cell can also transcribe the DNA back into RNA as the first step in making viral proteins.retrovirus genome needs to be reverse-transcribed into DNA before it can be copied in the usual way. The enzyme that does this backward transcription is known as reverse transcriptase.The binding of CoVs to host cell surface receptors and membrane fusion processes are mediated by the Spike (S) protein composed of two subunits S1 and S2 (Paules et al., 2020).

## 2.5.Drug screening for SARS-cov-2

Initial drug screening is a primary stage of drug development. The first and most intuitive approach is to use available broad-spectrum antiviral drugs used to treat other viral infections whose efficacy and safety are already known(Klein *et al*., 2012). Interferon was endorsed officially to be used for clinical treatment at the early stage of COVID-19 but it turned out to be unsatisfactory because of no specific antiviral effect and its potential to upregulate. The second approach is to find effective inhibitors or drugs based on the available genome and the molecular model of related viral proteins. The catalytic sites of four enzymes of SARS-CoV-2 are highly conserved and homological with the sequences of SARS-CoV and MERS-CoV.Thus, applying the inhibitors for SARS-CoV and MERS-CoV might be viable options considering these viruses share similar biology.

### 2.5.1. Inflammatory and immune response of SARS-cov-2 infection

The rapid virus replication and cell damage are important factors that lead to acute inflammatory and immune responses. This rapid replication in the early stages of infection results in epithelial and endothelial cell apoptosis and increased vascular permeability, triggering the release of pro-inflammatory cytokines and chemokines,in large quantity. finding the key cytokines induced by SARS-CoV-2 infection and blocking its signal transduction will greatly reduce the damage of hyper-inflammatory response.In a case report of a non-severe patient with no respiratory failure and acute respiratory distress syndrome, the recruitment of immune cell populations was documented to occur in the patient's blood before resolution of symptoms. Antibody-secreting cells, follicular helper T cells, activated $CD4^+$ and $CD8^+$ T cells and IgM and IgG were detected in blood before symptomatic recovery and persisted for at least 7 days. Based on the previous coronavirus infections, innate immune response can serve either protective or destructive roles. The protective innate immune response to viral infection mainly depends on the type I IFN response and its downstream cascade, which ultimately controls viral replication and later induces an effective adaptive immune response( Allocati et al., 2016).

## 2.6. CONTROL WAYS OF RNA VIRUS

### 2.6.1. Control of MERS and SARS

Many countries adopted aggressive quarantine measures including massive lockdowns as their major control strategy to either stop the virus from spreading to other areas or to slow down the transmission such that the healthcare system can cope up. However, because this approach has severe impact to the economy, most countries were unable to sustain months-long lockdown. The most effective strategy so far, as also advocated by WHO, is to 'test, isolate and trace' (Suresh *et al.*, 2008).

### 2.6.2. Simple precautions to reduce chance of cov-19 spreading

Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water, Maintain at least 1metre (3 feet) distance between yourself and anyone who is coughing or sneezing.When someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person coughing has the disease,Avoid touching eyes, nose and mouth Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can make you sick,Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately,Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance. Follow the directions of your local health authority, and Keep up to date on the latest COVID-19 hotspots (cities or local areas where COVID-19 is spreading widely). If possible, avoid traveling to places – especially if you are an older person or have diabetes, heart or lung disease(Backer et al., 2020).

## 2.7. Emerging technology againist sars-cov-2

The development of therapeutic drugs and vaccines and the rapid detection and diagnosis are critical in a pandemic. With the rapid advances in medical and information technology, artificial intelligence and nanotechnology, the emergence of interdisciplinary approach to capitalize these new technologies are proving to be crucial in prevention and control .application of PROTACs is increasingly expanding ranging from cancers, immune-related disease and virosis.Second, the use of gene editing technology such as CRISPR-based nucleic acid detection for COVID-19 is a robust technology that can shorten the test time to less than an hour. The method involves purification and amplification of RNA extractive from patient specimens by loop-mediated, a fast thermostatic nucleic acid amplification technique, as well as application of CRISPR-Cas12-based technology. Another pioneering technology is the recently emerged Single-Nucleotide-Specific Programmable Riboregulators (SNIPRs) technology, a new high-precision genetic mutation detection method. Although it has not yet been applied for SARS-CoV-2, SNIPRs technology is a powerful tool to identify single-nucleotide mutations that is critical for precise detection of diseases.patients continued to transmit the virus for some time after recovery( Rakasz & Lynch, 2002) . Due to the high contagiousness of Ebola, many health care workers were also infected. Currently, there is an effective vaccine to prevent Ebola.

## 3. CONCLUSION

COVID-19, apart from becoming the greatest threat to global public health of the century is being considered as an indicator of inequity and deficiency of social advancement. As is implied in the name COVID-19, 'CO' stands for 'corona,' 'VI' for 'virus,' and 'D' for disease, and 19 represents the year of its occurrence. the disease rapidly circled the globe and has eventually affected every continent except Antarctica. the intermediate source of origin and transfer to humans is not clearly known. While the virus can infect anyone regardless of age and sex, certain groups are at higher risk. These vulnerable groups include children, pregnant women, the elderly, healthcare providers, immune compromised individual and others with comorbidities such as asthma, diabetes and heart diseases. . RNA viruses need to use the cellular machinery of the organisms they infect to make copies of themselves.

## 4. RECOMMENDATION

The emergence of COVID-19 at the end of 2019 has caused a large global outbreak and is a major public health issue. Genomic analysis revealed that SARS-CoV-2 is phylogenetically related to severe acute respiratory syndrome-like (SARS-like) bat viruses, bats could therefore be the possible primary sources. Women exhibit significantly higher life expectancies, while frequently experiencing disabilities earlier in life. RNA viruses need to use the cellular machinery of the organisms they infect to make copies of themselves. The first and most intuitive approach to control covid -19 is to use available broad-spectrum antiviral drugs used to treat other viral infections whose efficacy and safety are already known, because of this drug increase immunity response against virus.

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