

# AN INVISIBLE ENEMY TO MAN KIND: THE NOVEL COVID-19 CORONAVIRUS

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## ABSTRACT

Mankind has come a crossed various pandemics throughout the history. Mankind throughout the history is observing a very strong time fighting various invisible enemies: present day it's the novel COVID-19 coronavirus more disastrous to humans. Coronavirus has a appearance of having a crown hence it is named as "Corona" meaning crown in "Latin". COVID-19 is a highly transmittable and pathogenic viral infection caused by severe acute respiratory syndrome which emerged in Wuhan, China and spread around the world. The disease is transmitted by inhalation or contact with infected droplets. The symptoms are fever, cough, sore throat, breath lessns fatigue, malaise, pneumonia, acute respiratory distress syndrome and multi organ dysfunction. In the 2019 nCov acronym, "2019" is the year the virus was first detected "n" means "new" and "Cov" corresponds to the coronavirus family. On March 11, 2020, the WHO declared the outbreak to be a pandemic (WHO, 2020).

Keywords: *Pandemics, coronavirus, COVID-19, Wuhan, corona.*

## INTRODUCTION

Coronavirus (COVs) are a large family of viruses that cause illness ranging from mild common cold to severe disease like Severe Acute Respiratory Syndromes (SARS-COV). Coronavirus has appearance of having crown hence it is named as Corona, meaning crown in Latin. Corona are zoonotic, meaning they are transmitted between animals and human. Detailed investigations revealed that SRS-COV was transmitted from civet cats to humans. A novel corona is a new strain that has not been previously identified in human but there are several coronaviruses which are circulating in animals. The coronavirus belongs to the family of viruses that causes viral pneumonia including fever, breathing difficultly and lung infection (WMHC, 2020).

Coronavirus are large, enveloped, positive-stranded RNA virus. They have large genome among all RNA virus. The genome in packed inside a helical capsid formed by the nucleocapsid proteins and further surrounded by an envelope. Associated with the viral/envelopes are at least three structural proteins: the membrane protein and the structural proteins the membrane protein and the envelope protein are involved in virus assembly, where the spike protein mediates virus entry into hosts cells. Among the structural protein the spike forms large protrusions from the virus surface. Coronavirus usually affect mammals and birds, causing a variety of lethal diseases. In general coronavirus cause widespread respiratory, gastrointestinal and central nervous system disease in humans and other animals, threatening human health and causing economic loss from mild upper to lower respiratory tract infections (Li, 2016). The first genome of 2019-nCov was published by the research team led by Prof. Yong Zhang on January 10,2020 (Vero logical.org. Novel,2019). Within a month the virus spread quickly throughout China and globally. Although it is still early to predict the susceptible population, early patterns have shown a similar trend with Severe Acute Respiratory Syndromes (SARS) and Middle East Respiratory Syndromes (MERS) coronavirus, showing associations with age, biological sex and other health conditions (Fehr, A.R. Channappanavar, R. Perlman S, 2017).

Covid-19 has now been declared as Public Health Emergency of International Concern and pandemic by WHO (WHO, 2020). Other than 2019-nCov, there are six known coronaviruses in human: HCov-229E,

HCov-OC43, SARS-Cov, HCov-NL63, HCov-HKO, I and MERS-Cov (Li, Q Gnan, Wu.P. at, el 2020, N.H.C.C. 2020, SV. S Lin. J, at, el 2016, Chen Y. Lin. Q Guo, D 2020).

## OBJECTIVE OF THE STUDY

Although there is no vaccine for the 2019-nCov, the paper tries to attempt to analyze the route of origin, outbreak, mode of spreading, the symptoms, Diagnosis, preventive measures of the invisible pandemics which has reemerged in 2019 as a new threat to the world.

## METHODOLOGY

The study is qualitative based, various secondary data has been collected from various publications, reports, journals, internet, website and information collected from various sources.

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## ORIGIN OF COVID-19

The epidemic of unknown acute respiratory tract infection broke out first in Wuhan, China since 12 December 2019, possibly related to a sea food market. Several studies suggested that bat may be the potential reservoir of SARS-COV-2 (Giovenetti, M Benvenuto, D, Angeletti, S, Ciccozzi M 2020) Paraskevis D. Kostaki, EG. At, el, 2019) on December 31<sup>st</sup> 2019, china notified the outbreak to the WHO and on 1<sup>st</sup> January the Huanan Sea Food market was closed. On January the virus was identified as a coronavirus that Red >95% homology with the bat coronavirus and >70% similarity with SARS-COV. Environmental samples from Huanan sea food market also tested positive signifying that the virus originated from there. (Xinhua China's CDC, 2020). However, there is no evidence so far, the origin of SARS-COV-2 was from the seafood market. Rather, bats are the natural reservoir of a wide variety of COV's including SARS-COV (Hamton T, 2005, Li.W, Shi, Z. at el, 2005). The first fatal ease was reported on 11<sup>th</sup> Jan 2020. The massive migration of Chinese during the Chinese New Year fueled the epidemic. In December 2019, a novel coronavirus was first isolated from three patients with pneumonia, connected to the cluster of acute respiratory illness cases from Wuhan, China. Genetic analysis revealed that it is closely related to SARS-COV and genetically cluster within the genes *Beta coronavirus*, forming a distinct clade in liveage B of the subgenus *Sarvecovirus* together with two bat-derived SARS like strains (WHO, 2020, Zhu, N, Zhang D. at el. 2019).

## OUTBREAK OF THE PANDEMIC

The SARS-COV-2 is a novel strain of coronavirus that was first detected in the city of Wuhan, in the province of Hubei, in the People Republic of China a city with a population of 11 million. The outbreak started as a pneumonia of unknown causal agent at the end of December 2019. Phylogenetics analysis undertaken with available full genomes sequences suggest that bats appear to be the reservoirs of COVID-19 virus, but the intermediated hosts has not yet been identified (WHO, 2020). On 30<sup>th</sup> January 2020, the world Health Organization declared the outbreak a Public Health Emergency of International concern. The WHO recommended that the in-term name of the disease causing the current outbreak should be 2019-nCov acute respiratory disease. In the 2019-nCOv acronym, "2019" in the year the virus was first detected, "n" means "new" and "Cov" corresponds to the coronavirus family. Research in underway to understand more about transmissibility, severely, and other features associated with 2019-nCov (Li, Q, Wu. P, Wang X, at el 2020). It appeared most of the early cases had contact history with the original Sea food market (Zou. P, Yong, X. Wang, X.G. at, el, 2020). Soon, the secondary sources of infection were found to be human to human transmission among the close contacts. There was an increase of infected people with no history of exposure to wildlife or visiting Wuhan, and multiple cases of infection were detected among the medical professionals (Gralinki, I.E, Menachery. V.D., 2020). The 2019-nCov infection occurs through exposure to the virus and both the immunosuppressed and normal population appear susceptible, some studies have reported an age distribution of adult patients between 25 and 89 years old. Most adult patients are between 35 and 55 years old. There are fewer patients are between 35 and 55 years old. There are fewer identified cases among children and infants (Wang, C, Wang. X. 2020). The most affected and most risk

may be people with poor immune function such as older people and people with renal and hepatic dysfunction. Several health measures to prevent or slow down the transmission of the 2019-nCov: includes case isolation, identification and follow up contacts, environmental disinfection and use of personal protective equipment's. (Wei, Q. Ren, Z.2020). the 2019-nCov has been found to have higher levels of transmissibility and pandemic risk than the SARS-Cov as the effective reproductive number (R) of 2019-nCov (2.9) is estimated to be higher than the reported effective (R) of SARS (1.77) at the early stage (Liu, T., Hu, J. Kang, M, et al, 2020). The average incubation period of 2019-nCov were estimated to be  $4.8 \pm 2.6$ , ranging from 2.11 days and 5.2 days. The Chinese health authorities mention that the guidelines in average incubation duration of 7 days, ranging from 1-14 days.

On 11 February 2020, the International Committee on Taxonomy of viruses (ICTV) decided to name the virus as Severe acute respiratory syndrome Coronavirus-2 (SARS-Cov) and the WHO finally decided to name the disease caused by the virus as COVID-19 (for coronavirus disease identified in 2019) following large outbreak of the disease in multiple countries, with thousands of deaths around the world, on 11 March 2020, the WHO declared the outbreak to be pandemic.

### MODE OF TRANSMISSION

The novel COVID-19 coronavirus is transmitted by the following mechanisms.

- Spread from person to person among close contacts about 6 feet/1.8 meters.
- It spreads person to person via respiratory droplets produced when an infected person coughs or sneezes, similar to how influenza and other respiratory pathogens spread.
- The droplets can land in the mouth, noses and eyes of the people who are nearby or possibly be inhaled into the lungs.
- Transmitted by touching a surface or object that has virus on it and then touching their own mouth, nose, eyes, but this is not thought to be the main way the virus spreads. (Centre for Disease Control and Prevention, 2020)
- There have been reports that it can be spread from an asymptomatic infected patient to a close contact (Rothe, 2020).

Human to human transmission of COVID-19 coronavirus occurs mainly between family members, including relatives and friends who intimately contacted with patients or incubation carriers. It is reported that 31.3% of patients recently travelled Wuhan and 72% of patients contracting with people from Wuhan among the patients of the nonresidence of Wuhan (Guan, W. J Nu 27 et al 2020). The latest guidelines from Chinese health authorities describe three main transmission routes for 2019-nCov.

- 1) Direct Transmission, 2) Aerosol transmission 3) contact transmission.

Direct transmission is reported to occur when respiratory droplets are produced when an infected person coughs and sneezes are ingested or inhaled by individuals nearby in close proximity: Aerosol transmission may occur when respiratory droplets enter the air, forming aerosols and causing infection when inhaled into lungs and contact transmission may occur when a subject touches a surface or object contaminated with the virus. Individuals could be infected when they subsequently touch their mouth nose possibly eyes (National Health Commission, 2020).

In addition to these routes, a study also indicates that the digestive system is a potential transmission route for 2019-nCov infection. Since patients had abdominal discomfort and diarrhea, symptoms, researchers analyzed 4 datasets with single cell transcriptomes of digestive system and found that ACE2 was highly expressed in absorption enterocytes from ileum and colon. (Zang. H. Kang Z. Gong H, et al 2020)

## SYMPTOMS

Patients with 2019-nCov coronavirus, symptoms can include fever (>80% of the patients, cough (>80%), shortness of breath (31%) and muscle ach (11%) (Naushen Chen, 2020). A recent study led by professor, Nan Shan Zougs team, by 1099 laboratory confirmed cases, found that the common Clinical manifestation include fever, fatigue, sputum production, shortness of breath, sore throat and headache (Guan, WJ, Ni, Z, Y, at. el, 2020). According to WHO the disease may also occur with wild symptoms only including: low fever, cough, malaise, rhinorrhea, sore throat without any warning signs, such as shortness of breath or difficulty in breathing, increased respiratory secretions, gastrointestinal symptoms such as nausea, vomiting and diarrhea and without changes in mental status (WHO, 2020). In addition, a part of part of patient manifested gastrointestinal symptoms, with diarrhea and vomiting fever, cough were the dominate symptoms whereas upper respiratory symptoms and gastrointestinal symptoms were rare, suggesting the difference in viral tropism as compared with SARS-COV (Lee, N. Hui. D, WU, A. at, el 2003), and influenza (Wang, H, Xiao. X, et al, 2016). The elderly and those underlying disorder like hypertension, chronic pulmonary disease, diabetes, cardiovascular disease, developed into acute respiratory distress syndromes, septic shock, metabolic acidosis hard to correct and coagulation dysfunction, even leading to the death. (Hnang. C. Wang Y. et, al 2020). Disease in children appears to be relatively rare and wild with approximately 2.4% of the total reported cases reported among individuals aged under 19 years. A very small proportion of those aged under 19 years have developed severe (2.5%) or critical disease (0.2%) (WHO, 2020) .

## DIGNOSIS

There are different types of coronavirus tests that can be done:

- Swab test- in this case, a special swab is used to take a sample from nose or throat.
- Nasal Aspirate – In this case a saline solution will be injected into the nose and, then a sample is taken with a light suction.
- Tractual Aspirate- In this case, a thin tube with a torch, also known as bronchoscope, is put into the mouth to reach the lung from where a sample is collected.
- Sputum Test- Sputum is thick means that get accumulates in the lung and come out with a cough. During the test one is required to cough up sputum in a special cup or a swab is used to take sample from the nose.
- Blood Test- In this case, a blood sample is taken from a vein in the arm.
- A rapid test also been started for the COVID-19, which involves taking samples from the nose, throat and lungs. This ensures a speedy and accurate diagnosis and is used in all CDC approved.
- To date no specific antiviral treatment has been confirmed to be effective. Regarding infected patients with 2019-nCov, it has been recommended to apply appropriate symptomatic treatment and supportive case.

## TREATMENT

At present there is no treatment specially approved for COVID-19, and no cure for an infection, although treatments and vaccines are currently under study, instead, treatments focusses on managing symptoms as the virus runs its course. Since, there is no specific antiviral treatment recommended for COVID-19, and no vaccine is currently available. The treatment is symptomatic and oxygen therapy represents the major treatment intervention for patients with severe infection. Mechanical ventilation may be necessary in cases of respiratory failure refractory oxygen therapy, whereas hemodynamic support is essential for managing septic shock.

On January 28, 2020, the WHO released a document summarizing WHO guidelines and scientific evidence derived from the treatment of previous epidemics from HCovs. This document addresses measures for recognizing and sorting patients with severe acute respiratory disease: strategies for

infection prevention and control: early supportive therapy and monitoring: a guideline for laboratory diagnosis: management of respiratory failure and ARDS: management of septic shock, prevention of complications: treatment: and considerations for pregnant patients. Among these recommendations, we report the strategies for addressing respiratory failure including protective mechanical ventilation and high flow nasal Oxygen (HFNO) or non-invasive ventilation (NIV). Yet, the expert doctors provide following coronavirus treatment according to the patient Centre diagnosis including the laboratory COVID-19.

### **Some of the treatment of COVID-19**

- Antiviral medication: the doctors try to minimize the symptoms prescribing antiviral medication to the patients. This coronavirus treatment would work for the patients suffering from the standard cold due to coronavirus.
- Steroids: in rare cases, steroids may help to overcome the symptoms, steroids may help in pain relief and regulations of the respiratory tract. Again. This helps in the initial stage and mild to moderate cold cough, and some smelling of lungs and the lower respiratory tract. The doctors implement this treatment for severe acute respiratory syndrome (SARS) if the patient does not respond to general antivirus medication.
- Blood Plasma administration: Sometimes, doctors administer blood plasma of a person already recovered from SARS. This treatment provides a positive boost to the immune system of the patient.

### **PREVENTION AND CONTROL**

Prevention and control strategies and methods should be at National level, case related population level, general population level, household level and initiative of the individuals. At present there is no vaccine preventing 2019-nCov. The best prevention is to avoid being exposed to the virus (Ow, F. Wu, H. Zhang. J. et al, 2020). Airborne preventions and other protective measures have been discussed and proposed for prevention. Infection prevention and control measures that may reduce the risk of the exposure includes: Use of face mask, covering coughs and sneezes with tissues that are then safely disposed of : regular hand washing with soap or disinfection with hand sanitizer containing a least 60% alcohol, avoidance a contact with infected people and keeping the distance as much as possible (at least 1 meter); and the refrain from touching the eyes, nose and mouth with unwashed hand, preventive measures on public transportation, public place, at home and thoroughly cooking meat and eggs. There should be scientific knowledge on the way to handle the 2019-nCov outbreak, there should be elimination of panic among the general population.

**CURRENT STATUS OF THE OUTBREAK**As on 20<sup>th</sup> may 2020 ( 9:15 pm )

Total cases	50,19,700	
Total deaths	3,25,712	
Recovered	19,81,736	
Active cases	27,12,252	Mild condition: 26,66,794 (98%) Critical condition: 45,458 (2%)
Closed cases	23,07,448	Recovered/ discharged: 19,81,736 (86%) Deaths: 3,25,712 (14%)

( Source: <https://www.worldometers.info/coronavirus/>)**CONCLUSION**

There is no vaccine or specific medicine recommended to cure or treat COVID-19. People of all ages can be infected by this invisible virus. people of all ages should take care to protect themselves from the virus maintaining good hand hygiene and good respiratory hygiene. Prevention and control measures of the invisible pandemic should be incorporated with the masses on the other hand public health has to be pushed at higher level. More scientific research, public policies on national, regional and community level should be implemented to stop the further spread of this invisible remerging virus. The threat is real and the time for action is now.

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