**Original Review Article****DOI: 10.26479/2021.0706.08****REVIEW: NOVEL CORONA VIRUS (NCOVID-2019) AND ITS  
IMPACT ON HUMAN LIFE****Raghvendar Singh<sup>1</sup>, Srikant Sharma<sup>2\*</sup>**

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**ABSTRACT:** Today, there is a serious health concern due to Covid -19, which is spreading all over the world (the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The virus originally found in bats and transmitted to humans through so far unknown transitional animals in Wuhan, Hubei province, China in December 2019. There have been around 20.3M reported cases of coronavirus disease 2019 (COVID-2019) and 222K reported deaths to date (04/05/2021) in India. The disease is transmitted by inhalation or contact with infected droplets and the incubation period ranges from 2 to 14 d. The symptoms are usually fever, cough, sore throat, breathlessness, fatigue, malaise among others. The disease is mild in most people; in some (usually the elderly and those with comorbidities), it may progress to pneumonia, acute respiratory distress syndrome (ARDS) and multi organ dysfunction. Many people are asymptomatic. The case fatality rate is estimated to range from 2 to 3%. Diagnosis is by demonstration of the virus in respiratory secretions by special molecular tests. Common laboratory findings include normal/ low white cell counts with elevated C-reactive protein (CRP). The computerized tomographic chest scan is usually abnormal even in those with no symptoms or mild disease. Treatment is essentially supportive; role of antiviral agents is yet to be established. Prevention entails home isolation of suspected cases and those with mild illnesses and strict infection control measures at hospitals that include contact and droplet precautions. The virus spreads faster than its two ancestors the SARS-CoV and Middle East respiratory syndrome coronavirus (MERS-CoV), but has lower fatality. The global impact of this new epidemic is yet uncertain.

**Keywords:** Covid-19, India, Transmission of disease. Multi-organ failure.

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## 1.INTRODUCTION

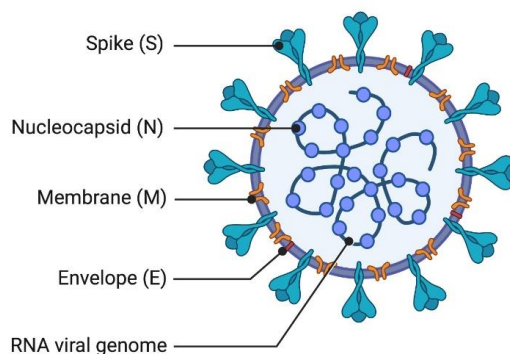
In fourth quarter of 2019, a new fatal virus identified in Wuhan, China, which is originated from bat and transmitted to human by unknown source. Scientist assigned 2019 novel corona virus (2019-nCoV) or the severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) to this virus, it is rapidly spreading from its origin place to the whole of the world [1,4]. Till today 04/05/2021 around 153Mcases of coronavirus disease 2019 (COVID-19) and 3.2M deaths have been reported [2]. India has reported 20.3M cases and 222K deaths till date. Earlier, the coronavirus showed very mild or no effect in children and young people. However, in its second wave, the virus is spinning out to be much unembellished for both children as well as grownups under 45. As per view of Dr Krishan Chugh, Director and head of the department of pediatrics at Fortis Memorial Research Institute, Gurgaon "higher rate of infections in children and new person under 45 age occurs. A sudden demise of early age patients occurs within few hours due to breakage of respiratory system and its blockage by mucus. This occurs due to reduction of O<sub>2</sub>level and breakage of Hb in blood. In most of the patients, who are affected by COVID-19, the signs present are continuous slight fever, sore throat, continuous cough, cold and gastrointestinal issues as well as weakness in whole body besides to this; some patients' complaints about body pain, headache, diarrhea and vomiting. But the future course of this virus is unknown. In this present article, we try to explain the effects of virus of younger age individuals. In the meantime, the data about this virus is speedily increasing, researchers and allied health workers has to update themselves on day by day bases. Coronaviruses are capable in altering itself to new environmental situations by mutating and recombining itself with relative ease and hence are automated to alter host range and tissue tropism efficiently [3,4,5]. Thus, it creates severe health issues from coronaviruses are persistent and long-standing. To control its spread, we have to understand the genetic and virologic study of coronaviruses. By its genomic study, we may able to control its epidemic and develop new effective herbal medicine with no side-effect. This is very much importance to global health and economic stability.

### Structure of Corona Virus

According to blog of Jonathan [28], the coronavirus particles are organized with long RNA polymers tightly packed into the centre of the particle, and surrounded by a protective capsid, which is a lattice of repeated protein molecules referred to as coat or capsid proteins. In coronavirus, these proteins are called nucleocapsid (N). The coronavirus core particle is further surrounded by an outer membrane envelope made of lipids (fats) with proteins inserted. These membranes derive from the cells in which the virus was last assembled but are modified to contain specific viral proteins,

including the spike (S), membrane (M), and envelope (E) proteins

## Coronavirus Structure



**Source:** <https://www.biophysics.org/blog/coronavirus-structure-vaccine-and-therapy-development>

Its enveloped positive sense RNA viruses ranging from 60 nm to 140 nm in diameter with spike like projections on its surface giving it a crown like appearance under the electron microscope; hence the name coronavirus [6]. Four corona viruses namely HKU1, NL63, 229E and OC43 have been in circulation in humans, and generally cause mild respiratory disease. There have been two events in the past two decades wherein crossover of animal beta-corona viruses to humans has resulted in severe disease. The first such instance was in 2002– 2003 when a new coronavirus of the  $\beta$  genera and with origin in bats crossed over to humans via the intermediary host of palm civet cats in the Guangdong province of China. This virus, designated as severe acute respiratory syndrome coronavirus affected 8422 people mostly in China and Hong Kong and caused 916 deaths (mortality rate 11%) before being contained [2]. Almost a decade later in 2012, the Middle East respiratory syndrome coronavirus (MERS-CoV), also of bat origin, emerged in Saudi Arabia with dromedary camels as the intermediate host and affected 2494 people and caused 858 deaths (fatality rate 34%) [7].

### Out- Break

The origin and spreading of corona virus start from Wuhan City of China in December 2019, adults in Wuhan, where it registered as unknown pneumonia which is fatal in nature [1, 2, 8]. Primarily, it was noted in local hospital of capital city of Hubei province and a major transportation hub of China. Initially it was seen that it spread through trading of live animals from Wuhan city especially through bat. Investigation by the surveillance system was activated and respiratory samples of patients were tested through highly equipped Lab and on December 31st 2019, World Health Organization was informed by China about the notified the outbreak of virus and on January 01, 2020, the Huanan sea food market was closed. On 7th January 2020, the virus was named as a coronavirus as it had >95% homology with the bat coronavirus and > 70% similarity with the SARSCoV. It is noted that the environmental samples from the Huanan Sea food market was also tested positive which signified

about the origin of said virus [9]. After initial stage, this virus was found transmitted through human to human via shake hand, sneezing and out-hailing process and the number of cases increased day-by-day [10]. The first death was reported on Jan 11, 2020. The epidemic was fuelled by the massive migration of Chinese during the Chinese New Year. Cases in other areas of China and other countries like Thailand, Japan and South Korea in quick succession were reported in people who visited and were returned from Wuhan, China. The time period of incubation of this virus is 7 to 14 days and it is easily transmitted to the people in crowded areas. Especially healthcare workers are much under threat as they are directly involved in treatment process of Covid-19 patients. To control this epidemic, nearly whole world was under lockdown for 3 months in 2020 and 40 percent world is under lockdown from March-April to till date in 2021. All countries start screening at international entries of their respective airports. Soon it was identified that the contagion could be transmitted from asymptomatic people as well as before beginning of symptoms. It is important to note that while the number of new cases has reduced in China lately, they have increased exponentially in other countries including South Korea, Italy and Iran. Of those infected, 20% are in critical condition, 90% have recovered, and 308,566 (4846 in China and 303,720 in India) have died till date. Though the SARS-CoV-2 originated from bats, the intermediary animal through which it crossed over to humans is uncertain. Pangolins and snakes are the current suspects. Epidemiology and Pathogenesis [11,12]. This pandemic effect nearly all age groups. In first wave (2020), elderly people most affected by this virus and in second wave (2021) young age group most affected by this corona virus. As per experts and WHO proposed that third wave may affect children. Infection is transmitted through large droplets generated during coughing and sneezing by symptomatic patients but can also occur from asymptomatic people and before onset of symptoms [13]. Higher viral loads present in the nasal cavity as compared to the throat with no difference in viral burden between symptomatic and asymptomatic people [14]. Before clinical recovery, patients can be infectious for as long as the symptoms last. Many people may act as super spreaders; a UK citizen who attended a conference in Singapore infected 11 other people while staying in a resort in the French Alps and upon return to the UK [15]. These infected droplets can spread 6-8 feet and deposit on surfaces of anything. The virus can remain viable on surfaces for days in favourable atmospheric conditions but are destroyed in less than a minute by common disinfectants like sodium hypochlorite, hydrogen peroxide etc. [16]. Infection is acquired either by inhalation of these droplets or touching surfaces contaminated by them and then touching the nose, mouth and eyes. It is found that the virus is also identified in the stool and contamination of the water supply and subsequent transmission via aerosolization/feco oral route is also hypothesized [16]. As per current information, transplacental transmission from pregnant women to their fetus has not been described [14]. However, neonatal disease due to post-natal transmission is described [17]. As previously informed that the incubation period of virus varies from 2 to 14 d probably in median 5d. Aangiotensin receptor 2 (ACE2) was

identified as the receptor through which the virus enters the respiratory mucosa [12]. In various modelling studies, the basic case reproduction rate (BCR) is estimated to range from 2 to 6.47. In comparison, the BCR of SARS was 2 and 1.3 for pandemic flu H1N1 2009 [2].

### **Medical Topographies**

Medical Topographies [1, 18, 19; 20, 21] of COVID-19 are varied, the patient may remain asymptomatic state to acute respiratory distress syndrome and multi organ dysfunction. Fever (not in all), cough, sore throat, headache, fatigue, headache, myalgia and breathlessness are the main symptoms of this virus as well as conjunctivitis has also been described. Thus, they are indistinguishable from other respiratory infections. In a subset of patients, by the end of the first week the disease can progress to pneumonia, respiratory failure and death. This progression is associated with extreme rise in inflammatory cytokines including IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1A, and TNF $\alpha$  (Chen, et al.,2020). Out of all infected patients only 25-30% needed to be hospitalized and only 5% need I.C.U. due to acute respiratory distress syndrome (ARDS) 8 d. Complications witnessed included acute lung injury, ARDS, shock and acute kidney injury. Recovery started in the 2nd or 3rd wk. The average duration of hospitalization in those who recovered was 10 d. Adverse outcomes and death are more common in the elderly and those with underlying any other medical history like asthma, heart disease (50–75% of fatal cases). Fatality rate in hospitalized adult patients ranged from 4 to 11%. The overall case fatality rate is estimated to range between 2 and 3% [2]. that the virus infection in milder in outside to Hubei provenance as comparable to Wuhan [21]. According to WHO report of 2020, the severity and case fatality rate in patients outside China has been reported to be milder. This may either be due to selection bias wherein the cases reporting from Wuhan included only the severe cases or due to tendency of the Asian population to the virus due to higher expression of ACE2 receptors on the respiratory mucosa [12]. It is also found that the infection rate was much milder in neonates as comparable to adults in first wave as comparable to their adult counterparts. As the epidemic progresses, commercial tests will become available easily and two type of test present now antigen test and RTPCR test. Another home test kit also developed by researchers. On the other hand, many other laboratory investigations are usually non-specific. The white cell counts usually normal or low. There may be lymphopenia; a lymphocyte count <1000 has been associated with severe disease. The platelet count is usually normal or mildly low. The CRP and ESR are generally elevated but procalcitonin levels are usually normal. A high procalcitonin level may indicate a bacterial co-infection. The ALT/AST, prothrombin time, creatinine, D-dimer, CPK and LDH may be elevated and high levels are associated with severe disease. The chest X-ray (CXR) usually shows bilateral infiltrates but may be normal in early disease. The CT is more sensitive and specific. CT imaging generally shows infiltrates, ground glass opacities and sub segmental consolidation. It is also abnormal in asymptomatic patients/ patients with no clinical evidence of lower respiratory tract involvement. In fact, abnormal CT scans have

been used to diagnose COVID-19 in suspect cases with negative molecular diagnosis; many of these patients had positive molecular tests on repeat testing [23]. Differential Diagnosis [24]. Viral Diagnosis for Covid-19 includes all types of respiratory viral infections which include influenza, parainfluenza, respiratory syncytial virus (RSV), adenovirus, human metapneumovirus, identification, atypical organisms (mycoplasma, chlamydia) and bacterial infections. Differentiation of COVID-19 is not possible for by using routine lab tests. Initially travel history was important for identifying the epidemic but after community spread, patient identifications are made through antigen and RTPCR.

### **Treatment**

Before starting 2021, no accurate treatment was available for Covid-19, supportive medicine therapy was given to patients, which includes allopathy and ayurvedic medicine. Treatment is basically helpful and suggestive. After identification of patient, the first step is to confirm acceptable separation or isolation from other healthy individual to avoid spread. Minor infection may be managed at home isolation and regular counselling with medical expert about risk signs of Covid-19. Main focus of medical worker to control the spreading and multiplication of virus in lungs and maintain high level of nutrition as well as cough and fever control. In hypoxic patients, provision of oxygen through nasal prongs, face mask, high flow nasal cannula (HFNC) or non-invasive ventilation is indicated. Mechanical ventilation and even extra corporeal membrane oxygen support may be needed. Renal replacement therapy may be needed in some. Antibiotics and antifungals are required if co-infections are suspected or proven. Antiviral drugs such as ribavirin, lopinavir-ritonavir have been used based on the experience with SARS and MERS. In a historical control study in patients with SARS, patients treated with lopinavir-ritonavir with ribavirin had better outcomes as compared to those given ribavirin alone [19]. Antiviral therapy consisting of oseltamivir, ganciclovir and lopinavir-ritonavir was given to 75% of the patients. The duration of non-invasive ventilation was 4–22 d [median 9 d] and mechanical ventilation for 3–20 d [median 17 d]. In the case series of children discussed earlier, all children recovered with basic treatment and did not need intensive care [25]. There is anecdotal experience with use of remdeswir, a broad-spectrum anti RNA drug developed for Ebola in management of COVID-19 [27]. More evidence is needed before these drugs are recommended. Other drugs proposed for therapy are arbidol (an antiviral drug available in Russia and China), intravenous immunoglobulin, interferons, chloroquine and plasma of patients recovered from COVID-19 [24, 25, 26] Additionally, recommendations about using traditional Indian herbs find place in the Indian govt guidelines.

### **Prevention**

Several properties of this virus make prevention difficult namely, non-specific features of the disease, the infectivity even before onset of symptoms in the incubation period, transmission from asymptomatic people, long incubation period, tropism for mucosal surfaces such as the conjunctiva,

prolonged duration of the illness and transmission even after clinical recovery [8,24]. As virus changes their structure and become mutant and it developed many strains different countries which become serious challenge to the researchers. Isolation of confirmed or suspected cases with mild illness at home is recommended. The ventilation at home should be good with sunlight to allow for destruction of virus. Patients should be asked to wear a simple surgical mask and practice cough hygiene. On the other hand patients with different severe illness has to be hospitalized with continued medical care. Caregivers should be asked to wear a surgical mask when in the same room as patient and use hand hygiene every 15–20 min. The greatest risk in COVID-19 is transmission to healthcare workers. In the SARS outbreak of 2002, 21% of those affected were healthcare workers [1]. Till date, almost 200 doctors, 150 nurses and 200 health workers in India have been died and nearly more than 3000 health care workers were died around the world. The doctor who first warned about the virus has died too. It is important to protect healthcare workers to ensure continuity of care and to prevent transmission of infection to other patients. While COVID-19 transmits as a droplet pathogen and is placed in Category B of infectious agents (highly pathogenic H5N1 and SARS), by the China National Health Commission, infection control measures recommended are those for category A agents (cholera, plague). Patients should be placed in separate rooms or cohorted together. Negative pressure rooms are not generally needed. The rooms and surfaces and equipment should undergo regular decontamination preferably with sodium hypochlorite. Healthcare workers should be provided with fit tested N95 respirators and protective suits and goggles along with PPE kits. Airborne transmission precautions should be taken during aerosol generating procedures such as intubation, suction and tracheostomies. All contacts including healthcare workers should be monitored for development of symptoms of COVID-19 for timely care of probable carriers of virus. After two consecutive negative reports of Covid-19, patients can be discharged from isolation and but may be taken under supervision. The person may start their working after 7 days of negative report. Negative molecular tests were not a prerequisite for discharge. To avoid community spread, people should be to avoid to visit crowded areas and postpone non-essential travel to places with constant spread of Covid-19. They must be requested to exercise cough sanitation by coughing in sleeve/ tissue rather than hands and practice hand hygiene frequently every 15–20 min by using sanitizer/soap. Patient with respiratory symptoms are advised to use N-95 masks /surgical Masks. The use of mask by healthy people in public places has shown to protect against respiratory viral infections and is currently recommended by WHO and people are advise to make 6 feet distance in crowded places

### **International Response**

International community has been very serious about the control of spreading to this fatal virus. Initially, international community inhibit or restrict the Chinese or china return travelers for their symptom's identification of Covid-19 and they may be allowed them after medical clearance by

respective countries. They may be undergoing 14 days surveillance for virus identification.

### **Vaccination**

A candidate vaccine was developed by many research institutes with the help of pharma industries. Some developed vaccines are Covishield, Covaxin, Sputnik-V, mostly two dose are required for antibody development against Covid-19. It is also identified that these vaccines may be helpful in other strains of said virus. In India, currently, vaccination programme individual above 18+ are undergone. Primarily, frontline workers were vaccinated after that elderly individuals of above 60+ and 45+ was vaccinated. Now vaccination of 18+ is under practice.

### **2. CONCLUSION**

The second wave of new virus outbreak has challenged the economic, medical and public health infrastructure of India and to some extent, of other countries particularly, its neighbours. Time alone will tell how the virus will impact our lives here in India. Nearly, all of our resources fail to fulfil medical needs of Covid-19 victims. More so, future epidemics of this virus and allied pathogens of zoonotic origin are likely to continue and more deadly to patients with pre medical complications and children as well. Hence, apart from limitation this outbreak, hard work should be made to create complete measures to prevent future outbreaks of zoonotic origin.

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### **ETHICS APPROVAL AND CONSENT TO PARTICIPATE**

Not applicable.

### **HUMAN AND ANIMAL RIGHTS**

No Animals/Humans were used for studies that are base of this research.

### **CONSENT FOR PUBLICATION**

Not applicable.

### **AVAILABILITY OF DATA AND MATERIALS**

The author confirms that the data supporting the findings of this research are available within the article.

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### **CONFLICT OF INTEREST**

There is no conflict of interest in this article.



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