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COVID–19: An Emerging Disease of 21st Century

Shweta Bhodiwal[1]*, Pankaj Yogi[2], Saim Pathan[1] and Tansukh Barupal[2]

1 Department of Botany, IIS University, Jaipur, Rajasthan, India
2 Department of Botany, MLSU, Udaipur, Rajasthan, India

***Corresponding author:** Shweta Bhodiwal

shwetabhodiwal.20@gmail.com; tansukhbarupal@gmail.com

Department of Botany, IIS University, Jaipur, Rajasthan, India.

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Abstract

A remarkable coronavirus termed as serious acute respiratory syndrome coronavirus-2 (SARS-CoV-2) was disengaged from the lower respiratory tract sample as a causative agent and present a significant danger to public health. It belongs to the genus Coronavirus and placed in family Coronaviridae. Phylogenetic analysis of the complete viral genome (29,903 nucleotides) revealed that the virus was most closely related (89.1% nucleotide similarity) to a group of SARS-like coronaviruses (genus Betacoronavirus, subgenus Sarbecovirus) that had previously been found in bats in China. This disease or infection is transmitted by the inhalation or contact with infected drops and the incubation time frame goes from 2 to 14 days. The symptoms of it are normally fever, cough, breathlessness, sore throat, fatigue, malaise among others. The infection is mild in most people (mostly the older one and those with comorbidities). It might advance to pneumonia, Acute Respiratory Distress Syndrome (ARDS) and multi organ dysfunction too. Many individuals are also asymptomatic. This outbreak features the on-going capacity of viral spill-over from animals to cause serious infection in humans. This review article includes the characteristics, morphology, symptoms, clinical progression and diagnosis of corona virus.

Keywords: Coronavirus; Infection; Humans; Symptoms; Capacity; Disease

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Introduction

The epic SARS-CoV-2 COVID that arose in the city of Wuhan, Hubei Area, China, dated December 8, 2019 and has since caused a large scale Coronavirus pandemic and thus spread in excess of 215 different nations or domains or areas. COVID is a kind of tainted infection which was discovered as novel agent on 9th January, 2020 [1]. Coronaviruses are encompassed non-fragmented positive sense RNA viruses that belong to the family Coronaviridae, the order Nidovirales and broadly present in the humans and other mammals [2]. Coronaviruses are RNA viruses which are phenotypically as well as genotypically diverse [3]. Chinese scientists or researchers recognized that the causative agent of this arising sever disease is a beta coronavirus that had never been seen previously and this is resultant by the meta genomic RNA sequencing and virus isolation from bronchoalveolar lavage fluid samples from patients with the severe pneumonia [4]. Serious sickness beginning may resultant to death because of massive alveolar damage and progressive respiratory failure [5].

In India, the first case of the COVID-19 was identified on 30 January 2020 and till 1 May 2021 total 19.9 M cases, 16.3 M recovered and 219 K deaths are observed (From Our World in Data and JHU CSSE COVID-19 Data). The causal source of the new coronavirus infection has been determined as bats. With full-length genome sequences, Zhou and colleagues tracked down that 2019-nCoV is 96% similar at the entire-genome level to a bat coronavirus. Serious intense respiratory syndrome-linked virus (SARS-CoV), up to this point unidentified COVID traced to horseshoe bats in southern China, caused 8,096 affirmed cases and 774 demises in 29 nations from November 2002 to July 2003. The distinguishing features of SARS-CoV-2 as compare to SARS-CoV is briefly described in **Table 1** [1].

The most ideal approach to prevent and slow down transmission is to be very much educated about the Coronavirus infection, the disease it causes and how it spreads. Protect yourself as well as other people from disease by washing your hands or utilizing an alcohol based rub much of the time and not contacting your face. The Coronavirus infection spreads basically through droplets of saliva or discharge from the nose when a contaminated individual coughs or sneezes, so it's significant that one should additionally

Table1 Differences in epidemiological characteristics of MERS (MERS-CoV), SARS (SARS-CoV), and COVID-19 (SARS-CoV-2).

Characteristic	MERS (MERS-CoV)	SARS (SARS-CoV)	COVID-19 (SARS-CoV-2)
First identified location	Jeddah, Saudi Arabia	Guangdong, China	Wuhan, China
Host of virus	-	-	-
Natural host	Bats	Bats	Bats
Intermediate host	Dromedary camels	Masked palm civet cat or other animal hosts	Pangolins
Terminal host	Humans	Humans	Humans
Period	2012 – ongoing	2002 – 2003	2019 – present
Estimated *R0*	<1	2-5	2-3
Incubation period	Median 5.2 days (95% CI, 1.9–14.7)	Mean 4.6 days (95% CI, 3.8–5.8)	Median 6.4 days (95% CI, 2.2–11.5)
Mode of transmission	Respiratory transmission, zoonotic transmission, nosocomial transmission, limited human-to-human transmission, aerosol transmission	Human-to-human through aerosol droplets, opportunistic airborne transmission, nosocomial transmission, fecal-oral transmission, zoonotic transmission	Human-to-human through fomites, physical contact, aerosol droplets, nosocomial transmission, zoonotic transmission
Case fatality rate	34.4%	9.6%	3.8%

practice respiratory etiquette (for example, by coughing into a flexed elbow) (according to WHO) [6].

Morphology and genome sequence of COVID-19

SARS-CoV-2 has surface viral proteins, in particular, spike glycoprotein (S), which mediates the connection with cell surface receptor ACE2. The surface viral protein spike, layer, and envelope of COVID are embedded in host membrane-derived lipid bilayer encapsulating the helical nucleocapsid containing viral RNA [7]. Coronaviruses are pleomorphic, enveloped viruses [8].

The size of coronavirus genome ranges from 26 to 32 kb and comprises of 6–11 open reading frames (ORFs) encoding 9680 amino acid polyprotein [7]. The six functional open reading frames (ORFs) are organized all together from 5' to 3': replicase (ORF1a/ ORF1b), spike (S), envelope (E), layer (M) and nucleocapsid (N). Also, seven putative ORFs encoding accessory proteins are scattered between the structural genes [4].

The primary ORF includes around 67% of the genome that encodes 16 non-structural proteins (nsps), while the leftover ORFs encode for accessory and structural proteins. The nsps includes two viral cysteine proteases, including papain-like protease (nsp3), chymotrypsin-like, 3C-like, or main protease (nsp5), RNA-dependent RNA polymerase (nsp12), helicase (nsp13), and others liable to be engaged in the transcription and replication of SARS-CoV- 2[7]. COVID-19 is different from further Coronaviruses by encoding accessory glycoprotein that has acetyl esterase what's more, hemagglutination (HE) properties [1].

Characteristics of the corona virus (sars-cov-2)

After MERS-nCoV and SARSnCoV, 2019-nCoV is the seventh member of the family of coronaviruses that infect humans. The 2019-nCoV is a β CoV of group 2B with more than 70% similarity in genetic sequence to SARS-nCoV [9]. Severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002 affects about 8000 and Middle East respiratory syndrome coronavirus in 2012 infected about 2,000 people. SARS-CoV has 4 genera which are as: Alpha-, Beta-, Gamma-, and Delta-coronavirus. SARS-CoV, SARA-CoV-2, and Middle East respiratory syndrome coronavirus are included under beta-coronaviru [10]. In view of the infection genome sequencing information, bats are presumed to be the reservoir of SARS-CoV-2, but the transitional hosts are not distinguished to date. SARS-CoV-2 enters into the host cell through binding its spike proteins, which regulate host tropism, to host cell receptors. Successive investigations uncovered that SARS-CoV-2 tie to angiotensin converting enzyme 2 (ACE2) as SARS-CoV does. SARS-CoV-2 was first confined from a bronchoalveolar lavage test and RNA of the infection was additionally recognized in nasopharyngeal and throat swabs as well as blood, stool, urine, and saliva [1].

Symptoms

Most common symptoms of COVID-19 is:

- Fever
- Dry cough
- Fatigue

Other symptoms that are less common and may affect some patients:

- Loss of taste and smell
- Nasal congestion
- Conjunctivitis (also known as red eyes)
- Sore throat- common symptom
- Muscle or joint pain
- Different type of skin rush
- Nausea or vomiting- in early stage of infection
- Diarrhoea
- Dizziness- common symptoms of double mutant virus
- No saliva production (www.who.Int)

Severe COVID-19 disease include

- Shortness of breath
- Persistent pain in chest
- High temp. – above 38°C

Other less common symptoms are:

- Confusion
- Sleep disorders
- Mental health
- Highest level of stress found in young generation

Research shows that the second wave of the pandemic negatively affected the mental health of respondents. A high percentage of respondents manifested anxiety and anxiety depressive disorders and declared having suicidal thoughts [11].

The analyzed disorders shows relationships between genders, education, increased consumption of alcohol, smoking and range of strategies for coping with the pandemic stress.

Prevention from corona virus

Age specific health education

Preschool: Focus on good health behaviours such as covering cough and sneezes with the elbow and washing hand frequently.

Primary school: Introduce the concept of social distancing and other safe. Focus on good health behaviours, such as sneeze and cough. Demonstrate why it is important to wash for 20 seconds.

Secondary school: Study of viruses, diseases transmission and the importance of vaccination. Social studies can focus on the history of pandemics and their secondary effects.

Cultural behaviour in society: Behaviours in society like regular hand washing (for 20 second), sanitization of hands, maintain social distancing, and complete isolation of COVID patients. Follow the guidelines of WHO and vaccine must be taken. (Vaccine develops not only antibody in our body but also it leads to herd immunity in society).

How corona virus spreads

The virus can spread from an infected person's mouth or nose in small liquid particles when they cough, sneeze, speak, sing or breathe. These particles range from larger respiratory droplets to smaller aerosols. (Droplets particles is less than 5-10micronmetre in diameter).

Peoples may also become infected by toughing surfaces that have been contaminated by virus when toughing their eyes, nose or mouth without cleaning their hands.

Clinical progression and diagnosis of corona virus

COVID 19 shows a variety of clinical symptoms ranging from asymptomatic to dizziness. At in earlier stage vomiting and nausea are some clinical symptoms.

On the basis of severity of COVID-19 infection it might be characterized into mild, moderate and serious.

Laboratory confirmation of COVID-19 is usually by detection of one or more SARS-CoV-2 targets using an RT-PCR assay. The most common clinical specimens are oronasopharyngeal or combined oronasopharyngeal swabs. Other samples used include saliva, tracheal secretions and Broncho alveolar lavage fluid. False negative PCR results occur and most likely during the asymptomatic period or due to other pre-analytical considerations such as unsuitable swab material or poor collection technique. Saliva samples and self-collected oronasopharyngeal swabs have lower sensitivity than swabs collected by a trained worker. False positivity infrequently arises due to contamination during laboratory processing (https://apps.who.int). Alternative method to confirming diagnoses are viral isolation in tissue culture is demonstration of a rising antibody titer.

Conclusion

The COVID-19 pandemic is dispersing the world dynamically at a disturbing recurrence. Factors as like ageing and immunocompromised patients are at the outrageous danger of mortality. The brief extent of pandemic requires serious examination and quarantine conventions to block further transmission. The vaccine of this pandemic is available in market, so it is compulsory to take vaccination at time to get rid of this disease. Every individual is required to be aware in every possible ways.

Conflicts of Interest

The authors declare no conflict of interest, financial or otherwise..

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