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Review Article

Coronavirus: Hotspot on coronavirus disease 2019 in India

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ABSTRACT

The novel coronavirus disease (COVID-19) or also known as the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has been recognized as the cause of respiratory infection in Wuhan, Hubei Province, China, in late December 2019. As of April 5, 2020, this epidemic had spread to worldwide with 12,03,485 confirmed cases, including 62,000 deaths. The World Health Organization has declared it a Global Public Health Crisis. Coronavirus causes respiratory illness coughing, sneezing, breathlessness, and fever including pneumonia. The disease is transmitted person to person through infected droplets. At present, the research on novel coronavirus is still in the primary stage. Based on the published study, we thoroughly summarize the history and origin, microbiology and taxonomy, mode of transmissions, target receptor, clinical features, diagnosis, prevention, and treatment about COVID-19. This short report writes in hope for providing platform to community and researcher dealings against with the novel coronavirus and providing a reference for further studies.

Keywords: Coronavirus, COVID-19, Severe acute respiratory syndrome-CoV

INTRODUCTION

The novel coronavirus (2019-nCOV) as well, severe acute respiratory syndrome 2 (SARS-CoV-2) was first detected from patients with pneumonia of an unknown reason in Wuhan City of Hubei territory of China to the worldwide in December 2019.[1] Since it has been confirmed as the pathogen for the novel coronavirus, recently named as coronavirus disease 2019 (COVID-19) by the World Health Organization. Globally, until April 5, 2020, there have been reported 12,03,485 confirmed cases and 62,000 deaths.[2,3] India has reported 3577 cases till date. The coronavirus may cause various respiratory infection such as coughing, sneezing, pneumonia, fever, breathlessness, and lung infection. The disease is transmitted by direct contact with infected droplets and the incubation period ranges from 2 to 14 days. COVID 19 is mild in most peoples in some elderly peoples having underlying medical problem such as diabetes, chronic respiratory disorders, and cardiovascular disease are more possible to develop severe illness such as pneumonia, acute respiratory distress syndrome, and multiorgan dysfunction.[4,5]

HISTORY AND BEGINNING OF CORONAVIRUS

Coronavirus is first observed in the mid-1930[6] and first human coronavirus found in 1960 as a cold.[7] Around 500 patients were recognized as flu-like system according the study was done

by Canada in 2001. A total of 17–18 cases were confirmed as infected with coronavirus by polymerase chain reaction (PCR) and were treated as uncomplicated non-fatal virus till 2002. Later, 2003, β-genera species of coronavirus were originated from bats and transmitted to human through mediator host of palm civet cats in the Guangdong territory of China and designated as SARS, 8422 people get affected from coronavirus and 916 caused death before being controlled in China and Hong Kong.[8] Nearly, in 2012, the Middle East Respiratory Syndrome coronavirus (MERS-CoV) as well bat origin, emerged in Saudi Arabia with camel as the mediator host and affected 2494 people and caused 858 deaths.[9] Novel coronavirus (COVID-19) was first recognized and isolated from pneumonia patient belongs to Wuhan, China.[10,11]

MICROBIOLOGY AND TAXONOMY

Coronavirus is spherical; single stranded, enveloped RNA viruses from 60 to 140 nm in diameter and covered with club shaped glycoprotein when observed in electron microscope,[12] as shown in Figure 1. According to the International Committee on Taxonomy of Viruses, coronavirus is belonging to order *Nidovirales*, family Coronaviridae, and subfamily Coronavirinae. Based on serological evidences, coronavirinae is divided into four genera: Alphacoronavirus (α), betacoronavirus (β), gammacoronavirus (ϒ), and deltacoronavirus (δ).[13] Some of them were affected human and causes respiratory infection as well as other affected to animal such as cats, mice, pigs, and dog. Classification of coronavirus according to their class and subclass is as shown in Table 1.

MODE OF TRANSMISSIONS

Person to person contact is major way of transmission of COVID 19 according to Centers for Disease Control and Prevention (CDC). Human can get infected through close contact with a person has respiratory symptoms (e.g., coughing or sneezing), spreads primarily through airborne droplets of saliva or discharge from the nose, and transmission route represent in Figure 2. Communication may also occur through object in the direct environment around the infectious people.[14] Therefore, spread of the SARS-CoV-2 virus can happens by direct contact with infectious person and indirect contact with objects in the immediate environment. Some evidence shows that it may also transmit through intestinal infection and are present in feces.[15]

DRUG TARGET

According to recently publish research, SARS-CoV attaches to the target cell with the help of spike protein host cell protein interaction with angiotensin converting enzyme-2 and MERS-CoV to dipeptidyl peptidase-4.[16-18] Later receptor identification, the virus genome with its nucleocapsid is released into the cytoplasm of the host cells. In addition, seven major targets such as membrane protein, envelope protein, spike protein, nucleocapsid protein, hemagglutinin esterase, and helicase[10] for designing of lead can considered. Moreover, 16 non-structural proteins may also consider for the development of CoV-specific drugs.

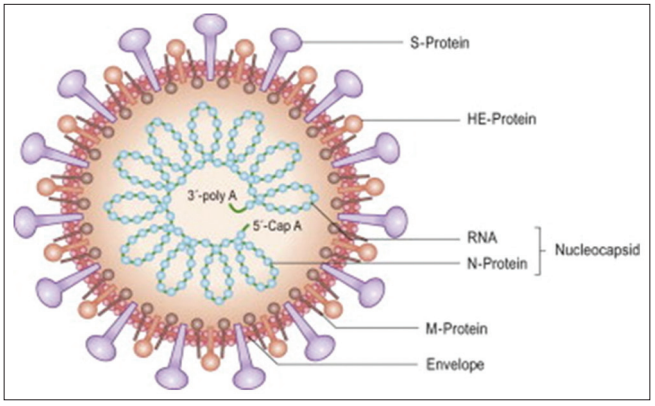

Figure 1: Schematic of coronavirus. S-Protein: Spike glycoprotein forms the bulky glycosylated peplomers that are feature of coronaviruses. HE-Protein: Hemagglutinin-esterase which forms smaller spikes on virus. RNA-Protein: Nucleocapsid enclosed by an envelope containing viral glycoproteins. N-Protein: Is a phosphoprotein that is complexed with genome RNA to form the nucleocapsid. M-Protein: The transmembrane protein is highly hydrophobic and spans the membrane 3 times. E, a membrane-spanning protein, is a minor component of the membrane.

Table 1: Taxonomy of HCoV.

Order: *Nidovirales*	
Family: *Coronaviridae*	
Subfamily: Coronavirinae	
Genus	HCoV-229E
Alphacoronavirus	HCoV-NL63
Betacoronavirus	HCoV-OC43
	HCoV-HKU1
	SARS-CoV
	MERS-CoV
Gammacoronavirus	-
Deltacoronavirus	-

HCoV: Human coronavirus, MERS-CoV: Middle East Respiratory Syndrome coronavirus, SARS-CoV: Severe acute respiratory syndrome coronavirus

CLINICAL FEATURES

According to the healthcare professional and study published, most people infected with coronavirus will experience with

many common features such as mild to moderate respiratory illness coughing, sneezing, sore throat, breathlessness, low grade fever, and fatigue even as diarrhea. COVID 19 is mild in most peoples in some elderly peoples having underlying medical problem such as diabetes, chronic respiratory disorders, and cardiovascular disease which is more possible to develop severe illness. In neonates, infants and children have been also reported to be notably milder than adults. The coronavirus was isolated form bronchoalveolar lavage fluid and in blood sample. Common symptoms of COVID-19 are summarized in Table 2.[19-21]

Diagnosis

At present, few laboratory tests are available that can recognize the virus that causes COVID-19 in respiratory specimens. State and local public health departments have received tests from CDC while medical providers are getting tests developed by commercial manufacturers. For suspected infection person, performing real-time PCR fluorescence use to detect the positive nucleic acid of SARS-CoV-2 in the lower respiratory tract samples such as throat swab, nasopharyngeal swab, sputum, endotracheal aspirates, and bronchoalveolar lavage.[22-23] Coronavirus may also be detected in the stool and in severe cases, the blood. As the epidemic progresses, commercial tests will also become available for diagnosis of COVID-19.

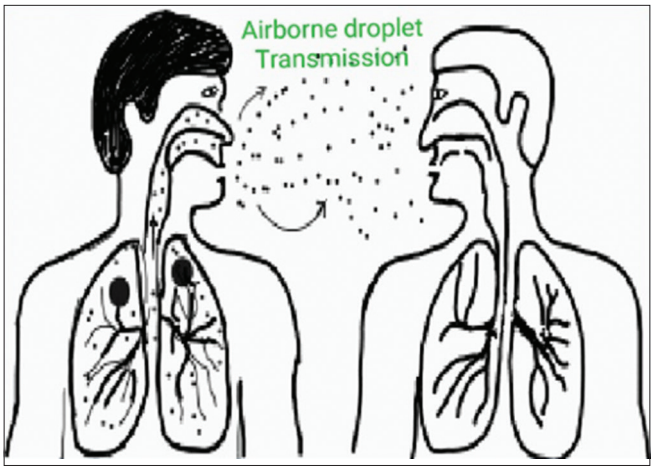

Figure 2: Coronavirus transmission route through airborne droplet of infected person.

Table 2: Common symptoms of COVID-19 infected person.

More common symptoms	Sign of deterioration	Less common symptoms
Fever	Severe breathlessness	Sneezing
Dry cough	Chest discomfort/ Pain	Runny nose Gastrointestinal symptoms
Fatigue	Respiratory distress hypotension	Sore throat
Shortness of breath		-

PREVENTION AND PRECAUTIONS

At present, there is no prescribe treatment for COVID 19, some guidelines were present by the world health organization (WHO) and European Centre for Disease Prevention and Control (ECDC). There is so many evidences published in studies about person to person transmission of corona virus. Some characteristics of this coronavirus make precaution difficult particularly, non-specific features of the disease, transmission from asymptomatic person, elongated incubation period, prolonged duration of the illness, and transmission even after clinical recovery. Separation of infected patient to other family member with mild illness at home quarantine is recommended. According to ECDC, some general guidelines were published such as avoid direct contact with sick person in particular those having cough, avoid visiting places were alive or dead animals are handled, maintaining overall good personal hygiene, wash your hand with soap or alcohol base sanitizer after using toilet and before eating, avoiding touching the eyes, nose, or mouth with unwashed hands, and coughing or sneezing into a tissue and putting the tissue directly into a waste container. Those who may already have infection have been advised to wear a surgical mask and avoid visiting to public places. Health-care providers taking care of infected person are recommended to use standard precautions, contact precautions, and eye protection.[24-27]

TREATMENT AND MANAGEMENT

There is no vaccine/drug have yet been shown to be safe and effective for the treatment of COVID-19. At present, the treatments of patients with SARS-CoV-2 infection are mainly symptomatic treatments and supportive management strategy, followed by health professionals. However, a number of medicines have been suggested as potential investigational therapies, many of which are now being or will soon be studied in clinical trials. Supportive treatment may include administration of antipyretic and analgesic for fever and cough, maintenance of hydration and nutrition, and mechanical ventilation and even extra corporeal membrane oxygen as respiratory support may be needed. Renal replacement therapy may be needed in some instant and use of antibiotics and antifungal is necessary if coinfections are proven.[28-32] 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.[33] Apart from this, remdesivir,[34,35] chloroquine, hydroxychloroquine, nucleoside derivatives, neuraminidase inhibitors, and peptide EK1 can also be the choices of antiviral drugs for COVID-19 treatment.[36] Still health professionals were not fully satisfied with any therapy so further clinical research needed.

SPREADING HISTORY OF COVID-19 IN INDIA

The first case of the new coronavirus (COVID-19) outbreak in India was reported on January 30, 2020, originating from China. Till April 5, 2020, there have been 3577 confirmed, 275 recoveries, and 83 deaths as per Ministry of Health and Family Welfare. According to the research and health-care professional, the infection rate of coronavirus in India is reported to be 1.7%, significantly lower than as compared to affected countries. The coronavirus epidemic in India as confirmed, recoveries, and death according to state and union territories cases till date, as show in Table 3 and date wise graphical representation of COVID-19 confirmed cases up to April 5, 2020, as represented in Figure 3.[37]

CONCLUSION

This bird's eye reviews spotlight on a current research progress in response to the pandemic of COVID-19. Recently, several studies have been published exploring the origin, taxonomy/microbiology, causes, clinical look and diagnosis, and prevention and control of the novel coronavirus. Thus far, most studies have focused on the epidemiology and potential causes. Thus, most of studies were focus on epidemiology and potential causes. Researches in this area are urgently required to reduce the impact of the epidemic. Coronavirus mainly transmitted through airborne droplets of infected person having sneezing and coughing. Hence, avoid contact and separate them if observed symptoms. As per the WHO and ECDC guidelines, stay away from with sick person. Potential research needed to

Table 3: Total number confirmed recoveries and death according to state and union territories in India.

S. No.	Name of State/Union Territories	Total confirmed cases (Including 65 foreign Nationals)	Cured/Discharged/ Migrated	Death
1	Andhra Pradesh	190	1	1
2	Andaman and Nicobar Islands	10	0	0
3	Arunachal Pradesh	1	0	0
4	Assam	26	0	0
5	Bihar	30	0	1
6	Chandigarh	18	0	0
7	Chhattisgarh	9	3	0
8	Delhi	503	18	7
9	Goa	7	0	0
10	Gujarat	122	18	11
11	Haryana	59	25	1
12	Himachal Pradesh	6	1	1
13	Jammu and Kashmir	106	4	2
14	Jharkhand	3	0	0
15	Karnataka	144	12	4
16	Kerala	306	49	2
17	Ladakh	14	10	0
18	Madhya Pradesh	165	0	9
19	Maharashtra	490	42	24
20	Manipur	2	0	0
21	Mizoram	1	0	0
22	Odisha	20	0	0
23	Puducherry	5	1	0
24	Punjab	57	1	5
25	Rajasthan	200	21	0
26	Tamil Nadu	485	6	3
27	Telangana	269	32	7
28	Uttarakhand	22	2	0
29	Uttar Pradesh	227	19	2
30	West Bengal	80	10	3
Total number of confirmed cases in India		3577*	275	83

*Count up to 5th April 2020 as per WHO website

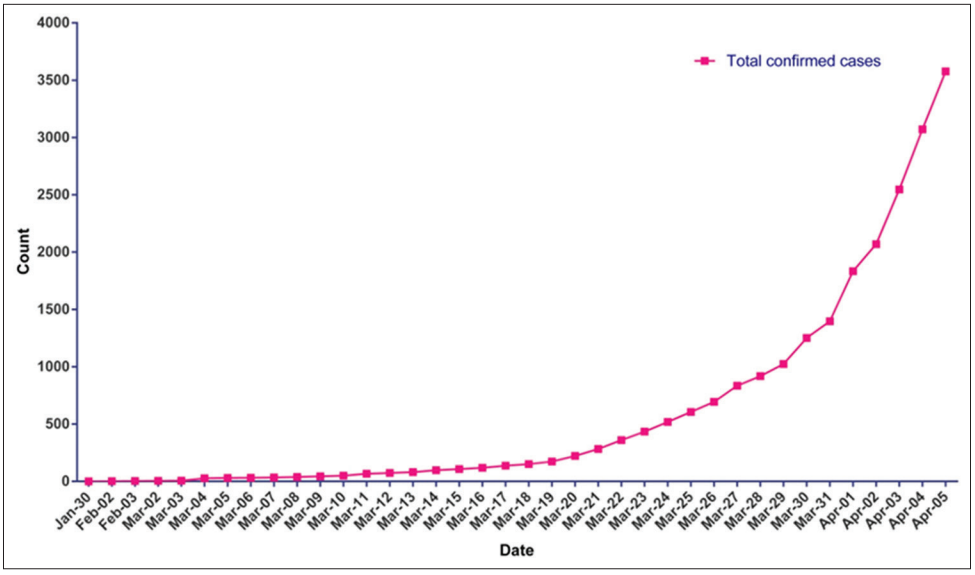

Figure 3: Date wise graphical representation of COVID-19 confirmed cases.

prevent future outbreaks of zoonotic origin. Till only "Social Distancing" is best vaccine against COCID-19.

Declaration of patient consent

Patient's consent not required as there are no patients in this study.

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Conflicts of interest

There are no conflicts of interest.

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