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# A Systematic Review Article on Coronavirus Disease 2019 (COVID-2019) Outbreak

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**ABSTRACT**
*Coronavirus disease (COVID-19) is begun by SARS-COV2 and signifies the causal agent of a possibly lethal disease that is of countless worldwide public health. Normally, the most corona viruses infect animals but can change its strains that cross the species barrier and infect human beings. At recent, there is no single specific vaccine or well-organized antiviral therapy against COVID-19. Based on the huge number of infected people that were exposed to the wet animal market in Wuhan City, China, it is optional that this is to be expected the zoonotic origin of COVID-19.This article will aim to deliver a brief review of current information of the COVID-19 acute respiratory disease, and precise applicable clinical features as currently reported.*
***Keywords:*** *Novel, Respiratory Syndrome, Leukocyte, Fever, Human, Pneumonia, Computed Tomography, RT-qPCR, Gastrointestinal*

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**Abbreviations:(**WHO):World Health Organization, (SARS-CoV-2): severe Acute Respiratory Syndrome Coronavirus 2, (SARS): Severe Acute Aespiratory Syndrome, (MERS):the Middle East respiratory syndrome, (PCR): Polymerase Chain Reaction, (MAPK): Mitogen-Activated Protein Kinase, (CT): Computed Tomography, (HRCT): High-Resolution CT, (PAMPs): Pathogen-Associated Molecular Patterns,(PRRs): Pattern Recognition Receptors, (ECMO): Extracorporeal Membrane Oxygenation

## INTRODUCTION

The Spring Holiday on January 25th 2020 has become an exceptional and notable memory to all Chinese who was ordered to stay at home for all the spring festival and until the order by the Govt. due to the outbreak of a novel viral disease. The genetic makeup of coronavirus (CoV) is virus is highly homologous to that caused an outbreak of severe acute respiratory syndrome (SARS) in 2003. On this basis it was named SARS-CoV-2 by the World Health Organization (WHO) on February 11th 2020. The disease caused by this virus was named as CoV Disease-19 (COVID-19). The conditions became epidemic started in Wuhan, China, and quickly reported entirely in the China with 50 others all over the world as well. As of March 2th 2020, the virus has resulted in over 80,000 confirmed cases of COVID-19, with more than 40,000 patients discharged and over 3,000 patients who died[1], [3].The coronavirus has its place to a family of viruses that may cause many signs such as pneumonia, fever, breathing difficulty, and lung infection[4].

These viruses are communal in common in wildlife universal, but actual few cases have been recognized to infect humans. The World Health Organization (WHO) used the term 2019 novel coronavirus to discuss to a coronavirus that infected the lower respiratory tract of patients with pneumonia in Wuhan, China on 29th December 2019[4], [6]. The WHO stated that the official name of the 2019 novel coronavirus is coronavirus disease (COVID-19) [7]. It was described that a collection of patients with pneumonia of unknown aim was associated with a local Huanan South China Seafood Market in Wuhan, Hubei Province, China in December 2019[8]. COVID-19 has the present day been stated as a Public Health Emergency of International Concern by the WHO [9].

Coronaviruses are surrounded, positive single-stranded large RNA viruses that infect humans, but also a wider variety of animals. Coronaviruses were initially reported in 1966 by Tyrell and Bynoe, who cultivated the viruses from patients with common colds. Founded on their structural as round virions with a core-shell and surface projections like a solar corona, they were called coronaviruses (Latin: corona = crown). Four categories, which are alpha, beta, gamma and delta coronaviruses, occur. Although alpha and beta-coronaviruses initiate from bats, gamma and delta viruses produce from cattle, flora and fauna. The genetic data size differs between 26 Kb and 32 Kb. Flanked by the seven subtypes of coronaviruses that can contaminate humans, the beta-coronaviruses may be the source of severe disease and fatalities, while alpha-coronaviruses cause symptomless or mildly symptomatic infections. COVID-19 belongs to the beta family of the coronaviruses and is repeatedly linked to the SARS-CoV virus[3].

The key four structural inheritable factors encode the nucleocapsid protein (N), the spike protein (S), a small membrane protein (SM), and the membrane glycoprotein (M) with an extra membrane glycoprotein (HE) happening in the HCoV-OC43 and HKU1 beta-coronaviruses [3]. COVID-19 is 96% similar at the whole-genome level to a bat coronavirus. The proportion of people infected by COVID-19 who continue asymptomatic through infection has not yet been assessed. In symptomatic patients' warning, signs usually start after less than a week, containing temperature, cough, nasal congestion, fatigue and other symbols of upper respiratory tract infections. The infection can change to severe disease with dyspnea and severe chest symptoms meeting the requirements of pneumonia in about 75% of patients, as seen by computer tomography on admission[10].

**DIAGNOSTIC AND TREATMENT**

Patients satisfying hygienics and clinical criteria as specified at www.gov.uk/ government/ collections/wuhan-novel-coronavirus are classified as a possible case. If a patient meets the case definition, clinicians should refer to the latest guidance from their public health authorities[11].Diagnostic sampling must be undertaken only with suitable infection control precautions and with the conversation with local infectious diseases and public health teams. The testing of any samples should take place in a Biological Safety Level 3 laboratory. It is vital to inform the laboratory before sending samples. The Primary publication of the microorganism genome has allowed quick development of a reverse transcription-polymerase chain reaction (PCR) based test, and whole-genome sequencing may also be accepted out on positive samples to aid kind of transmission and mutations. Point-of-care test kits are likely to be made accessible shortly for home testing. Serological markers have also been identified but are not currently useful for clinical diagnostics. Chloroquine, by growing the endosomal pH essential for virus-cell blend, has the probable of blocking viral contagion also was visible to affect the start of p38 mitogen-activated protein kinase (MAPK), which is complicated in the replication of HCoV-229E[12].

A mixture of the antiretroviral medicines lopinavir and ritonavir suggestively better the technical disorder of SARS-CoV patients[13]and strong point be an option in COVID-19 infections. Additional potentials contain leronlimab, an improved monoclonal antibody (CCR5 antagonist), and galidesivir, a nucleoside RNA polymerase blockage, both of which have exposed persistence aids in several deadly virus infections and are being measured as potential action candidates. Recover these existing medicines for direct use in handling COVID-19 infections could recover at present available scientific managing. Experimental trials now registered at Clinical Trials. Govt. focus on the effectiveness of redeliver, immunoglobulins, Arbidol Hydrochloride combined with Interferon atomization, ritonavir plus oseltamivir, lopinavir plus ritonavir, mesenchymal stem cell treatment, darunavir plus cobicistat, hydroxychloroquine, methylprednisolone and washed microbiota transplantation. According to recent information [2], [14], more than 85% of patients received antiviral agents, with oseltamivir (75 mg every 12 h, orally), ganciclovir (0.25 g every 12 h, intravenously), and lopinavir/ritonavir tablets (400/100 mg twice daily, orally). Experiential antibiotics were set for 90% of patients in three reports[2], [14], [15], and 15 patients received antifungal agents according to one study[14], Five (5.1%) cases of bacterial (n = 1) or Candida (n = 4) co-infections were reported in one study[14], and four (9.8%) cases of secondary bacterial infections were reported in another study[2].

While intravenous immunoglobulin and systemic steroids have been used in several reports their efficiency and related adverse effects keep on unclear[2], [15], [16]. For the study of COVID-19, though RT-qPCR is specific, its false-negative rate can take no notice because of the acute values of the missed study. So, numerous clinicians' future CT scans must be one desirable auxiliary diagnostic technique for the reason that it is extra sensitive. For individuals with a high clinical doubt of SARS-CoV-2 infection with negative RT-qPCR screening, a mixture of continuous RT-qPCR tests[17] and chest CT scans may be helpful. Particularly the aim of CT (HRCT) for the chest is vital for early diagnosis and assessment of illness severity of patients with SARS-CoV-2[1], [18].

Numerous studies have investigated chest CT images of patients infected with SARS-CoV-2[1], [18], [19]. The helpful treatment, including oxygen therapy, conservation fluid management, and the use of broad-spectrum antibiotics to cover secondary bacterial infection, remains to be the most important management strategy[1], [20].

**SYMPTOMS**

A current study led by Prof. Nan-Shan Zhong's team, by sampling 1099 laboratory-confirmed cases, initiate that the mutual scientific appearances involved fever (88.7%), cough (67.8%), fatigue (38.1%), sputum production (33.4%), shortness of breath (18.6%), sore throat (13.9%), and headache (13.6%) [10]. The most common symbols being described are fever, cough or chest tightness, and dyspnoea. Most cases are stated to experience a mild illness course[6].The scientific signs of patients infected with SARS-CoV-2 are highly atypical, with respiratory symptoms, cough, fever, dyspnea, and viral pneumonia. The experimental symptoms and signs of patients sick with SARS-CoV-2 are highly unusual, plus respiratory symptoms, cough, fever, dyspnea, and viral pneumonia [1]. Also, a part of patients exposed gastrointestinal sign, with diarrhea (3.8%) and vomiting (5.0%). The scientific presence was dependable with the prior data of 41, 99, and 138 patients study in Hubei province[10], [11].

Fever and cough were the main warning sign while upper respiratory symptoms and gastrointestinal symptoms were occasional, suggesting the differences in viral tropism as linked with SARS-CoV, MERS-CoV[21], and influenza[9], [22]. Patients with COVID-19 show clinical manifestations contain fever, nonproductive cough, dyspnea, myalgia, fatigue, normal or reduced leukocyte counts, and radiographic evidence of pneumonia, which are like to the signs of SARS-CoV and MERS-CoV infections[2], [9], [23], [24]. In laboratory checkup results, most patients had usual or decrease white blood cell counts, and lymphocytopenia [2], [10].Besides, the CT imaging exhibited that computed tomography on the chest was ground-glass opacity (56.4%) and bilateral patchy shadowing (51.8%), occasionally with a round structure and an outer lung distribution, studied after the patients in the Fifth Affiliated Hospital, Sun Yat-Sen University[9], [19].

A supplement study from the same center which involved these patients and a further 58 cases initiate a global death rate of 11% with 23% of patients requiring ITU admission, with the status of older males with comorbidities. Half of the patients were directly linked with the seafood market, including 47 salespeople or market managers. In an epidemiological study of the first 425 cases in Wuhan, almost half were in adults of 60 years "older" but, noticeably, the case definition at the time specified severe enough illness to require medical attention, thereby potentially missing milder performances or biasing against younger patients with fewer comorbidities. [5], [6].

**CONTROL, TRANSMISSION,AND PREVENTION**

It is vital to bound human-to-human transmission to the reduction of secondary infections among near associates and health care laborers and stops transmission amplification trials and further global feast from China. Based on earlier knowledge of the evolution of the MERS and SARS infections, the WHO mention contaminations which mediates, to decrease the over-all danger of the spread of acute respiratory infections, with avoiding close contact with people suffering from acute respiratory infections, common hand-washing, particularly after direct contact with ill people or their environment, and avoiding insecure with farm or wild animals. Also, people with signs of acute respiratory infection should practice cough protocol, which is to keep distance, cover coughs and sneezes with disposable tissues contact or clothing, and wash hands, and within healthcare facilities, increase normal infection prevention and control performs are recommended in hospitals, particularly in emergency sections. The Centers for Disease Control and Prevention in the United States have well-known temporary clinical guidance for the COVID-19 outbreak to device violent actions to slow the transmission of the SARS-CoV-2 in the United States [25], [26].

Human-to-human transmission of SARS-CoV-2 occurs mostly among family associates, relatives, and friends who strictly contacted with patients or incubation transporters[25]. The chief danger in COVID-19 is spread to healthcare workers. In the SARS epidemic of 2002, 21% of those affected were healthcare workers[27], [28][28], [29]. Human-to-human transmission is now well recognized for COVID-19, with an R0 (the predictable amount of secondary cases produced by a single (typical) infection in a completely susceptible population) currently estimated by the WHO as 1.4–2.5[6].For comparison, seasonal flu has a reported median R0 of 1.28 (IQR 1.19–1.37), while measles has an R0 usually reported as 12–18[6], [30], [31]. The virus has also been detected in patient stool samples. Fomite spread via dirty surfaces is also possible, based on SARS-CoV. The Exemplary spread is also a significant concern. The mean development period is short, reported as 5.2 days, with the 95$^{th}$ percent of the delivery at 12.5 days (95% confidence interval 9.2–18)[5].

One occasion is known as an incubation period of just 3 days[5]. There are six scientific trials recorded in both the Worldwide Clinical Trials Registry Stage and the Chinese Clinical Trial Registry to measure the efficiency of care of targeted drugs in the treatment or prognosis of COVID-19[21], [32]. Regarding infected patients with COVID-19, it has been suggested to spread over proper symptomatic treatment and supportive care[2].A sequence of trials has been suggested to decrease nosocomial infection, including facts training for prevention and control, isolation, disinfection, top secret defenses at different degrees in infection areas, and protection of confirmed cases. Regarding psychological health, some suggested psychological involvement for confirmed cases, suspected cases, and medical staff [33].In control of scientific knowledge on ways to handle the COVID-19 outbreak, the guideline also recommends ways to remove suffering between the over-all inhabitants[34].

## HOSTS IMMUNE RESPONSE AND IMMUNOPATHOLOGY

The immune retort is significantly used for the control and determination of CoV infections, although it let go principal to immune pathogenesis, related to the immune response out of control. The S proteins of Coronavirus fixes to the host cells by ACE2, fusing to the membrane and release the viral RNA. The viral RNAs, as pathogen-associated molecular patterns (PAMPs), are observed by the design recognition receptors (PRRs). Normally, Toll-like receptor (TLR) 3, TLR7, TLR8, and TLR9 sense viral RNA and DNA in the endosome [9], [35]. Collectively, the virus particles attack the respiratory mucosa first and infect other cells, activating a sequence of immune responses and the manufacture of cytokines storm in the body, which may be linked with the critical condition of COVID-19 patients. Nearly all patients accepted oxygen therapy, and WHO recommended extracorporeal membrane oxygenation (ECMO) to patients with refractory hypoxemia[9].

Release action with improving plasma and immunoglobulin G [36]is brought to approximately dangerous cases according to their situations. At present, the first partial information is existing on the host innate immune position of SARS-CoV-2 infected patients. In one statement where 99 cases in Wuhan were examined, amplified total neutrophils (38%), reduced total lymphocytes (35%), increased serum IL-6 (52%) and increased c-reactive protein (84%) were observed[3]. In a separate report also from Wuhan, it revealed that in 41 patients, increased total neutrophils reduced total lymphocytes in patients of ICU *vs* non-ICU care started to be statistically different. Increased neutrophils and decreased lymphocytes also correlate with disease severity and death. Also, patients needing ICU care had developed plasma levels of many innate cytokines, IP-10, MCP-1, MIP-1A, and TNFα[2], [35].

The actual innate immune response in contrast to viral infection depends on deeply on the interferon (IFN) type I responses and its downstream cascade that closes in regulatory viral replication and induction of effective adaptive immune response. While SARS-CoV and SARS-CoV-2 appear to share the entry receptor of ACE2, MERS-CoV uses dipeptidyl peptidase (DPP)-4 as anexact receptor[35]. Antigen performance then inspires the body's humoral and cellular immunity, which are facilitated by virus-specific B and T cells. Like common acute viral infections, the antibody side view in contrast to the SARS-CoV virus has a characteristic form of IgM and IgG manufacture. The SARS-specific IgM antibodies died out at the end of week 12, while the IgG antibody can last for a long time, which specifies the IgG antibody may mostly play defensive parts[1], and the SARS-specific IgG antibodies mainly are S-specific and N-specific antibodies

## CONCLUSIONS

There has been a quick flow in research in retort to the outbreak of COVID-19. Through this primary historical, published research mainly discovered the epidemiology, reasons, scientific appearance, and analysis, as well as anticipation and control of the novel coronavirus. Even if these studies are related to control the current public emergency, more good research is required to deliver valid and dependable ways to succeed in this kind of public health emergency in both the short- and long-term.

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