

# An Overview Study on Corana Virus its Symptoms and its Variants

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**Abstract:** *The virus of COVID 19 was first eidentified during December 2019 in Wuhan, Hubei Province, China. COVID-19 was caused by a new virus called SARS-CoV-2. In India, the First case of COVID-19 was reported on January 27, 2020, in Kerala district. Coronaviruses, belonging to the Coronaviridae family. most common symptoms of COVID19 were fever, cough, myalgia, or fatigue. Have many variants found like D614G, N501Y, E484K, Alpha variant, Beta variant, Delta variant, Omicron.*

**Keywords:** Corana virus,covid 19,SARAS-COV-2, D614G, N501Y, E484K, Alpha variant, Beta variant, Delta variant, Omicron

## I. INTRODUCTION

A virus is a small parasite that cannot undergo self-reproduction and once it infects a susceptible cell, the virus can direct the cell machinery to produce more viruses.[1] The virus of COVID 19 was first eidentified during December 2019 in Wuhan, Hubei Province, China. Due to the severe rise in the number of cases of virus in globally, WHO declared COVID-19 as a pandemic on 11th March 2020.[2]. COVID-19 was caused by a new virus called SARS-CoV-2. In India, the First case of COVID-19 was reported on January 27, 2020, in Kerala district. Coronaviruses, belonging to the Coronaviridae family, cause respiratory infection in mammals, such as bats, camels and masked palm civets, and in avian species [3]. Bats are most likely the ecological reservoir for the COVID-19 virus. Given the extremely small close Human-bat interaction can result in the transfer of viruses. It's possible that humans evolved from an intermediary animal. such as a wild animal, tamed animal, or other wild animal that is yet unidentified. It is possible for people who are unaffected to spread the virus to one another, showing that COVID-19 can spread even during the period of development phase. SARS COV-2 is a virus that may survive for hours on various surfaces[4]. It is more stable and durable on plastic and stainless steel surfaces, which have lower copper content than cardboard

## II. HISTORY

The name corona viruses were derieved form the Latin word corna which means crown crown or halo, as a result of the surface spikes that, when investigated under an electron microscope, like a crown[5]. The Coronavirinae subfamily consists of four genera: alphacoronavirus, betacoronavirus, deltacoronavirus and the gammacoronavirus[6]. Coronaviruses are 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. Based on reports, animal reservoirs including bats, mice, rats, hens, dogs, cats, horses, and camels are were coronaviruses are primarily found. Human coronaviruses were first discovered in the 1960s. In the last 20 years, there have been two instances when human infection has been caused by animal betacorona virus crossover. The first SARS related Corona virus was discovered in the horseshoe bat species (*Rhinolophus sinicus*)[7]. Moreover, they belong to a large family of single-stranded RNA viruses (+ssRNA) that are isolated from different anial species

## III. SYMPTOMS

There are vide range of symptoms of corona virus found in the infected patients ,ranging from mild/moderate to severe. The most common symptoms of COVID19 were fever , cough, myalgia , or fatigue. In severe condition Some patients may present with sore throat, rhinorrhoea, headache[8]. some patients experience loss of smell (hyposmia) or taste (hypogeusia), which are now being considered early warning signs and indications for self-isolation[9]. Some common symptoms are as given

- Fever or chills.
- Cough.
- Shortness of breath or difficulty breathing.
- Fatigue.
- Muscle or body aches.
- Headache

#### IV. VARIANTS OF COVID 19

##### 1. D614G

The SARS-COV-2 virus D614G point mutation within the virus's spike genome began to spread quickly through the population in late February 2020. that after some time, almost all Covid19 viruses had this mutation[10]. Compared to the original SARS-COV-2, this mutation is more pathogenic and has a higher transmissibility, according to preliminary research. The D614G-encoded mutation of the Spike protein in the S1 domain's C terminal region is directly related to S2. This mutation, which replaced the amino acid glycine with aspartic acid, was prevalent throughout the world. In this variation, the amino acid glycine is used in place of the acid aspartic at position 614 in the chain.

##### 2. N501Y

This mutation initially appeared in South Africa and the United Kingdom .This mutation is on the RBD, and it significantly increases the affinity of the host cell receptor[11]. The N501Y mutation causes the spike protein's position 501 to contain tyrosine instead of the amino acid asparagine[12]. The ACE2 receptor's affinity for wild-type SARS-COV-2 is four times higher in the N501Y. Additionally, the mutation-carrying variants are more likely to spread due to N501Y[13]. The variant from South Africa and the United Kingdom spread much more quickly than the non-N501Y variant, quickly taking over as the predominant variant.

##### 3. E484K

The resistance of the E484K mutation to neutralization may have an impact on vaccinations and other antibody-based countermeasures like monoclonal antibodies. Multiple variants of E484K have been found to have mutations[14]. It was first found in the Brazilian variant, then in the South African variant.Important locations The spike protein experiences the E484K mutation, which starts the viral entry process in the receptor binding motif of the RBD are affected by the mutation[15]. Since the primary functional motif directly affects binding to the ACE2 receptor, it remains largely unaltered. E484K is made up of lysine [K], a positively charged amino acid, in place of glutamic acid [E], a negatively charged amino acid. The spike protein's receptor binding domain contains the amino acid substitution at position 484[16].

##### 4. Alpha variant

One of the first mutated strains from the original SARSCOV-2 is the SARS-COV-2 Alpha variant. In September 2020, this variation was discovered in the United Kingdom[17]. The Alpha variant has several RBD mutations, including N501Y, P681H, at positions 69–70, 144 NTD deletions, and several non-spike mutations. These mutations make the Alpha variant a variant of concern[18]

##### 5. Beta variant

As of July 2021, the Beta variant was discovered for the first time in South Africa in May 2020. The beta variant carries nine major mutations that make it a variant of concern[19]. These include RBD mutations (N501Y, E484K, and K417N) and NTD deletions at positions 242-244 in the spike protein. Numerous studies have reported the detection of partial or complete viral evasion from mAB[20].

##### 6. Delta variant

Early in 2020, the delta variant was discovered in India. In many countries, the delta variant quickly took over as the predominant strain[21]. Delta variant is the most transmissible of all the variants discovered to date, according to a WHO

announcement made early in the variant's emergence (WHO Official Updates - Coronavirus Disease 2019)[22]. The delta variant contains 23 mutations, the most significant of which are the P681R cleavage site mutation and the E484Q and L452R RBD mutations in the spike protein. Research on this variation has revealed multiple mutations on ORF3, ORF7 as well[23]. Compared to other variants, this one has had a higher rate of transmission and infectiousness. Studies carried out in Scotland revealed that young children had a high frequency of the Delta variant[24]. Patients with the Delta virus frequently experience the following symptoms: fever, cough.

## 7. Omicron

In Nov 2021, this variant was initially discovered. Omicron is categorized as a variant of concern due to certain properties that raise concerns[25]. With over 50 mutations, the majority of which are related to immune escape or have a higher transmissibility, this variant is highly variable [26]. There is no connection to any earlier variants, and this variant has a great deal of mutations (42)[27]. Its spike protein contains over thirty genetic variations, as discovered by scientists . Although opinions on the emergence of this variant vary, it is certain that the first cases of this variant were found in Botswana, Southern Africa. One theory regarding the emergence of the virus is that this variant emerged in immunocompromised.

## V. COVID-19 TRANSMISSION

### 1. Animal-to-Human Transmission

According to current findings, the source of COVID-19 transmission is bats; however, people may have contracted the virus from other intermediary species, maybe obtained from the nearby seafood market in Wuhan, Hubei province, China[28]. A majority of the Chinese and Malayan wild pangolins tested positive for SARSCoV-2-like coronaviruses, according to the study.

### 2. Human-to-Human Transmission-

Several reports have stated that in order for SARSCoV-2 to spread, a carrier must be present; however, other viral transmission mechanisms have also been noted during this pandemic[29]. According to a recent study by Chanetal. The case reports of six patients who tested positive for SARS-CoV2, along with their medical history, contact tracing information, and epidemiological, clinical, radiological, and microbiological discoveries[30]. One of the six family members tested positive for SARS-CoV-2 after having close contact with the other members despite not having traveled to Wuhan. This was one of the first cases of positive person-to-person transmission of COVID-19[31]. Since respiratory droplets released by an infected person are now known to be the primary mode of human-to-human transmission, coughing and sneezing can spread SARS-CoV-2, increasing the risk of infection among those who are not afflicted

### 3. Nosocomial-Related Infections

Hospitals are recognized as one of the hubs for secondary SARS-CoV-2 transmission due to the high number of infected patients they treat [32]. Another method of COVID-19 transmission that has been documented involves viral contamination in hospital rooms where patients are receiving care[33]. It is essential that the medical sector carefully considers strategies to implement in order to control the potential transmission within nosocomial environments, as SARS-CoV-2 spreads through droplets and fomites. Precautionary controls, in addition to decontaminating shared spaces, tools, and oneself, can be implemented to avert any possible spread while receiving medical care.

### 4. Maternal Transmission

Nine pregnant mothers who tested positive for SARS-CoV-2 have been reported to have no intrauterine vertical transmission potential with their offspring[34]. After being tested for SARS-CoV-2, all nine newborns were found to be virus-negative. Furthermore, the virus did not show up in tests conducted on breast milk samples, amniotic fluid, or cord blood obtained from the patients.

## VI. CLINICAL MANIFESTATION

### 1. Respiratory

55,924 laboratories confirmed cases of COVID-19 had fever (87.9%), dry cough (67.7%), fatigue (38.1%), sputum production (33.4%), breathing difficulties (18.6%), sore throat (13.9%), chills (11.4%), nasal congestion (4.8%), and hemoptysis (0.9%), according to a report from WHO-China-Joint Mission on COVID-19[35]. Certain COVID-19 patients may have had their blood oxygen saturation drop to as low as 50% or 60%, but they remained stable and did not experience any significant distress; these patients were referred to as salient hypoxia or happy hypoxia. non-rebreathing mask, and oxygen therapy are frequently employed in the treatment of these patients.

### 2. Cardiovascular

Patients with COVID-19 can develop cardiac symptoms as a result of cardiac pressure brought on by low oxygen levels and respiratory failure, direct cardiac effects of SARS-CoV-2 infection or as a result of inflammation and cytokine storm, metabolic disturbances, plaque rupture, and thrombus-induced coronary occlusion and effects of medications taken for medical purposes [36]. Rises in N-terminal pro-B-type natriuretic peptide (NT proBNP) and high sensitivity cardiac troponin (hsCTn), which correlate with elevated inflammatory markers, are also common in these patients' electrocardiographic (ECG) changes. Heart failure, hypotension, ventricular arrhythmias, atrial fibrillation, stress cardiomyopathy, acute and fulminant myocarditis, are the main occurrence.

### 3. Gastrointestinal

According to data from 2,023 patients, the most common gastrointestinal symptom in adults is anorexia[37]. The most frequent gastrointestinal symptom to present was diarrhea. symptom in children and adults when vomiting was discovered to occur more frequently in kids. Nausea, abdominal pain, and gastrointestinal bleeding were among the other common symptoms.

### 4. Preventative Strategies

Early in the pandemic, there was a lack of knowledge about COVID-19 and how to treat it, which made it urgent to lessen this new viral disease with pharmaceutical repurposing and experimental therapies[38]. Since then, as a result of the tireless efforts of clinical researchers everywhere, Significant advancements have been made, resulting in an enhanced comprehension of not just COVID-19 and its management, but it has also led to the creation of development of new medications and vaccines at an unparalleled quickness. Patients who test positive for COVID-19 show a wide range of symptoms. As a result, additional care needs to be used inside hospital grounds to prevent nosocomial illnesses from undiagnosed COVID-19 patients. The World Health Organization has released safety guidelines that may aid in the public's infection prevention [39]. The guidelines' most important recommendations are to stay at home if one is exhibiting symptoms of the disease, avoid close contact with infected people, regularly wash your hands and disinfect your home and frequently used items. The WHO has also released guidelines for preventing infections, which include basic knowledge about properly cooking meat and eggs, cleaning your hands, and covering your mouth and nose when you cough or sneeze[40]. Instructions describing specific travel precautions have been put in place worldwide to help stop the spread of the novel coronavirus. Many airports have installed testing stations to identify travelers who are symptomatic. In certain nations, quarantine checkpoints have been established at airports and other points of entry.

## VII. CONCLUSION

The World Health Organization (WHO) has declared a pandemic due to the novel coronavirus's spread. It is possible for this disease to spread from an asymptomatic person even during the incubation period, which presents a serious threat that could kill thousands of people. Since COVID-19 is spreading from person to person, more cases are anticipated to be reported in the future. This could lead to disruptions in international public health systems and financial losses

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