

# A Review on Epidemiology, Emergence, Spread, Clinical Aspects, Avoidance and Management Of COVID-19 Outbreak

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## ABSTRACT

**Background:** COVID-19 or corona virus outbreak is a major source of disaster in the year 2020 which has distraught about 220 countries around the globe. The source of the outbreak was first identified in the province of Wuhan, China in December 2019. As of now, there are about 52,00,000 positive cases of the virus by the last week of May 2020 causing approx. 3,42,000 deaths worldwide.

**Methods:** The objective of this review paper is to methodically analyse the reasons, findings, deterrence, and control of this virus. The secondary sources applied in this analysis have been taken from the data and information available on a public domain.

**Results:** Testing in a laboratory for the identification of the virus comprises of the usual or decreased counts of white cells with lofty protein C-reactive. The tomographic chest scan is typically anomalous yet in patients having no indications. Preclusion in this deadly ailment include entails isolation of suspected numbers. Strict precautionary measures are required with suspects.

**Conclusion:** This paper attempts to review the structure, cause of infection, direction of diffusion, pathogenesis, quantifiable attributes, management, and avoidance of virus.

**Key words:** Deterrence, Symptoms, Substantiations COVID-19, Management

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## INTRODUCTION

COVID-19 attracted the attention of the world from its commencement in Wuhan, China. The Respiratory ailment has been observed as the primary assail of the virus. It has been affirmed as a public health crisis by the WHO i.e., World Health Organization. According to the WHO, this virus makes up a hefty cluster of viruses that is capable to contaminate mammals, birds, and even humans. These viruses are accountable for numerous eruptions around the globe, counting 2015 and 2003 pandemics of Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome respectively [1,2]. COVID-19 generated an outburst in China in December 2019, embarking worldwide apprehension and distress. Though some corona viruses have originated upsetting epidemics in the past, others have caused mild to moderate respiratory contagion like common cold [3-6].

## EPIDEMIOLOGY AND PREVALANCE

According to the data recollected from one of the most hit areas of the virus in Hubei, China, a total of 81% of incidences were categorized as placid, 14 as stern and 5% were categorized as severe. The comprehensive rate of fatality was observed as 2.3%; though, in cases aging between 70–80 years, the fatality rate was 8.0% to 14.8%, respectively [7,8]. This data brings out significant statics. The devastating effect of the virus was prominent in elderly males with some chronic ailments like diabetes, depression, heart disease, etc [9]. The contagion of the virus is conveyed through droplets produced at the time of sneezing or coughing, by indicatives although it can happen from persons to show no symptoms at all [10]. Researches have revealed elevated viral loads of the virus in the nasal tract as matched up to the throat with no distinction in viral load amidst the indicative and non-indicative people [11,12]. The disease could be contagious until the indications are shown and yet on medical recuperation. Some could even operate as a super transmitter. Such cases might infect a good number of people in a truly short span [13].

As stated, the droplets of the diseased caused by coughing or sneezing can extend up to two meters on the surface and deposit there. The virus there can stay feasible on the surface for days in appropriate circumstances. However, they can be shattered in a few seconds as well by applying disinfectants like hydrogen peroxide, sodium hypochlorite etc [14]. Contamination is attained either by the intake of such droplets through inhalation or having contact with contaminated surfaces. Contact of these droplets to eyes, nose, or mouth infects a person by transmitting the virus in the body.

**ORIGIN AND SPREAD OF INFECTION**

Some patients reported to the hospital in December 2019 Wuhan, China. They all had a common problem like severe pneumonia. The administration was on the toes after the disclosure of a fact that all had one thing in common and that was their visit to the Huanan wholesale seafood market in the province. The observations were made on an urgent basis and respiratory tasters of such cases were sent to the labs for investigations. In the last week of December 2019, China released an alert of an outbreak of virus to the WHO, the World Health Organization.

The scrutiny of community genome succession data from SARS-CoV-2 and allied viruses is attempting to find the ground of origin of the virus. However, studies conducted so far indicate that the bats are the innate owner of SARS-CoV-2, and snakes pangolins are the transitional hosts. Research from Peking University recommended that COVID-19 contamination is in all probability is caused by snakes [15-19], though there is a varied opinion about this. Research from Wuhan Institute of Virology displayed 96.2% resemblance in the gene succession amidst SARS-CoV-2 and bat corona virus with succession expertise [20]. This inferred that bats are the probable cause of COVID-19. Pangolins too are the possible intermediary host of SARS-CoV-2. Though no work to date has completely expounded the latent biological host and intermediary host of SARS-CoV-2. The number of cases started rising at a swift speed. People having no direct approach to the market are indicative of the fact that human-to-human spread was happening. The primary deadly incident was accounted for on 11th Jan 2020 [21] (Table 1 and Figure 1).

#	Country, Other	Total Cases	New Cases	Total Deaths	New Deaths	Total Recovered	Active Cases	Serious, Critical	Tot Cases/ 1M pop	Deaths/ 1M pop	Total Tests	Tests/ 1M pop	Population
	World	6,302,150	+42,900	374,554	+859	2,866,574	3,061,022	53,510	809	48.1			
1	USA	1,839,898	+2,528	106,262	+67	599,925	1,133,511	17,075	5,561	321	17,709,503	53,528	330,843,477
2	Brazil	514,992	+143	29,341	+27	206,555	279,096	8,318	2,424	138	930,013	4,378	212,434,518
3	Russia	414,878	+9,035	4,855	+162	175,877	234,146	2,300	2,843	33	10,923,108	74,852	145,929,507
4	Spain	286,509		27,127		196,958	62,424	617	6,128	580	4,063,843	86,921	46,753,345
5	UK	274,762		38,489		N/A	N/A	1,559	4,049	567	4,285,738	63,158	67,856,881
6	Italy	232,997		33,415		157,507	42,075	435	3,853	553	3,878,739	64,144	60,468,778
7	India	194,504	+3,895	5,448	+40	93,343	95,713	8,944	141	4	3,837,207	2,783	1,378,863,298
8	France	188,882		28,802		68,355	91,725	1,319	2,894	441	1,384,633	21,217	65,261,942
9	Germany	183,564	+70	8,605		165,900	9,059	702	2,191	103	3,952,971	47,193	83,762,346
10	Peru	164,476		4,506		67,208	92,762	988	4,994	137	1,058,874	32,153	32,932,217
11	Turkey	163,942		4,540		127,973	31,429	648	1,946	54	2,039,194	24,201	84,262,291
12	Iran	154,445	+2,979	7,878	+81	121,004	25,563	2,578	1,841	94	955,865	11,393	83,900,826
13	Chile	99,688		1,054		42,727	55,907	1,383	5,219	55	582,440	30,490	19,102,509
14	Canada	90,947		7,295		48,879	34,773	1,641	2,411	193	1,665,831	44,169	37,714,510
15	Mexico	90,664	+3,152	9,930	+151	64,326	16,408	378	704	77	270,992	2,104	128,818,338
16	Saudi Arabia	87,142	+1,881	525	+22	64,306	22,311	384	2,506	15	822,769	23,666	34,766,601
17	China	83,017	+16	4,634		78,307	76	3	58	3			1,439,323,776
18	Pakistan	72,460	+2,964	1,543	+60	26,083	44,834	111	329	7	561,136	2,545	220,509,385
19	Belgium	58,517	+136	9,486	+19	15,919	33,112	163	5,051	819	876,306	75,638	11,585,527

Figure 1: Total Active cases deaths as on 2020-06-1.

Table 1: Daily incidence of Covid-19 as on 2020-05-19. (Source: <https://www.worldometers.info/coronavirus/>).

Countries	
Australia	Nepal
Canada	Malaysia
Cambodia	Philippines
France	The Republic of Korea
Finland	Singapore
Germany	Sri Lanka
India	Thailand
Italy	The United States of America

Japan

The United Arab Emirates and

Vietnam [18]

Research conducted in this area signifies that the multiplication of COVID-19 was moderately rapid and accounted that it had extended to quite a lot of other nations after its eruption in China. There were about 200 deaths on 31 January 2020, stated globally [17]. Positive established cases were found active in these nations.

### Molecular basics of transmission of coronavirus

Chinese researchers tested 33 samples containing SARS-CoV-2 on January 1st, 2020, and pointed to the fact that it sourced from animals sold in the market [22]. Later, they used blood, fluid of the lung, and a swab of throat samples of fifteen sufferers to perform tests. These investigations established the fact that the virus-centric nucleic acid successions in the taster are dissimilar from those of recognized human corona virus species. Laboratory outcomes besides pointed that SARS-CoV-2 is akin to some of the beta ( $\beta$ ) corona viruses genera recognized in bats [23-25]. The upshots of next-generation sequencing pointed that SARS-CoV-2 was far remote from SARS-CoV and MERS-CoV than from two bat-derived SARS-like corona viruses [26,27]. Researches also accounted that COVID-19 S-protein sustained brawny interface with human ACE2 molecules despite the distinction of its success with that of SARS-CoV28. Many domestic and wild animals can serve as hosts for coronaviruses. They include bats, camels, cats, and [25], it is measured that, usually, animal corona viruses do not reach among humans [28]. Though exceptions cannot be denied at the same time. At the time when a virus goes into the body, it combines the prime target cells such as pneumocytes and enterocytes thus creating a sequence of contagion and reproduction [22,23]. There are other target cells of CoV too which are epithelial renal tubules, immune cells, tubular epithelial cells of the kidney and cerebral neuronal cells [25].

The virus joins to the intended cells with the aid of spiked protein–host cell protein interaction. After the receptor acknowledgment, the virus genome is released into the host cells. The viral genome has ORF1a and ORF1b genes, which construct two PPs that are pp1a and pp1b [29-31], which assists to take directions over the host ribosome for their paraphrase process [32]. Both partake in the construction of the imitation dictation complex [33]. After dispensation of PP by protease, it produces 16 NSPs. All NSPs have their exact task such as restraint of host gene appearance by NSP1 and NSP2, an arrangement of a multidomain complex by NSP3, NSP5 which is a M protease having a role in replication. The initiation of commotion to the dimidiation of NSP9 can be a method to conquer CoV contamination [34]. NSP10 works as a co-factor for the commencement of the replicative enzyme [35]. NSP12 displays RNA-dependent RNA polymerase action, NSP13 indicated helicase actions, NSP14 displays exoribonuclease actions, NSP15 performs endoribonuclease action while NSP16 has methyltransferase action. All NSPs have an imperative role in duplication and record.

### SYMPTOMS

Preliminary symptoms of COVID-19 infection are very usual. They can be attached to the common symptoms of cold or flu-like symptoms. They are at first mild. Though, as per the resistant capacity and individual type, the symptoms may vary. The usual symptoms are:

- Cough.
- Exacerbated asthma.
- Fever in rare cases.
- Runny nose.
- Sneezing.
- Sore throat.
- Watery diarrhoea [36,37].

### MANAGEMENT OF COVID-19

RT-PCR has turned out to be the system of selection for the investigation of human CoV. They are capable to perceive all respiratory HCoVs and can be additionally personalized to novel CoVs. Serologic examinations are central in cases where RNA may be complicated to separate [38-40]. No anti-viral therapeutics are available to date that particularly targets human coronaviruses. A cure is merely helpful. Belligerent loneliness methods in China have emerged to a progressive decrease in incidences. Though it may have grounds for discussions and arguments on some platforms. Health authorities in Italy are making implausible labors to hold the pandemic that is ruthlessly testing the health system of the nation [41-43]. The WHO released a document on January 28, 2020, briefing its course of action and scientific proofs taken from the cure of earlier epidemic instances from HCoVs. Some of them are as follows:

#### Intubation and protective mechanical ventilation

Extraordinary safety measure is compulsory at the time of intubation. The method should be carried out by a professional hand who uses PPEs like FFP3 or N95 mask, shielding goggles, disposable double socks, and gown with long sleeve raincoat and gloves. If feasible, rapid sequence intubation (RSI) should be performed. Preoxygenation (100% O<sub>2</sub> for 5 minutes) should be practiced via unremitting affirmative airway pressure technique. Heat and moisture exchanger (HME) must be placed between the mask and the circuit of the fan. Furthermore, extrication from the ventilator must be let alone for averting loss of PEEP and atelectasis [44].

**Non-invasive ventilation**

The expert's panel, concerning the HFNO or non-invasive ventilation, indicates that the measures executed by a system with good interface connection do not generate extensive scattering of puffed-out air and their exercise could be measured at squat peril of airborne spread. Non-invasive practices can be executed in the non-critical appearance of respiratory breakdown. Though, if the situation does not get better or even deteriorate in a petite epoch of instance, the motorized airing must be favoured [45].

**Other strategies**

It has been suggested to apply suitable indicative healing and encouraging care<sup>46</sup> concerning to the patients infected with COVID-19. There are six medical trials to assess the effectiveness of the protection of aimed medicine in the cure or forecast of COVID-19<sup>47</sup>. It has been also suggested in terms of contaminated patients with COVID-19 to relate opposite symptomatic healing and compassionate care [46-48]. Researches have also discovered the deterrence of nosocomial contamination and psychological wellbeing concerns related to COVID-19. A succession of effective methods has been recommended to diminish nosocomial contamination, together with information guidance for preclusion and management, disinfection, seclusion, confidential defenses at diverse degrees in diseased spots, and guard of established affirmative cases [49]. On the psychological wellbeing, there are advisories for positive cases, suspects and medical and frontline staff [50]. Since there is no vaccine for the virus so far, the best way to stay safe is to avoid contact with the virus [51].

Here are some precautionary measures:

Avoidance to public areas.

Avoiding smoking.

Consuming only thoroughly cooking meat, eggs, or vegetables.

Covering mouth and nose while coughing and sneezing.

Customary hand washing.

Intake of enough water.

Keeping social distance.

Proper physical rest and psychological relaxation.

Using a fresh humidifier or cool mist vaporizer.

**CONCLUSION**

COVID-19 is a lethal virus. As discussed in the article, there is no recommended vaccine for the virus so far. In that case, it is advisable to follow safety measures and be cautious of the symptoms stated. However, researches are being made in various locations of the world and the expectations of mankind are extremely high for an acute vaccine of this deadly virus.

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