

Severe acute respiratory syndrome coronavirus-2**Niyaz Ahmad^{1*}, Ankita Singh², Bhawna Devi Chauhan³**¹*Associate Professor, Department of General Medicine Practice, Shri Mahant Indires Hospital, Patel Nagar, Dehradun, Uttarakhand, India*²*Associate Professor, Department of General Medicine Practice, Shri Mahant Indires Hospital, Patel Nagar, Dehradun, Uttarakhand, India*³*Student, Department of Clinical Pharmacy, Shri Guru Ram Rai Institute of Technology & Sciences, Patel Nagar, Dehradun, Uttarakhand, India***Received: 26-11-2021 / Revised: 17-12-2021 / Accepted: 09-01-2022****Abstract**

China first informed about the viral infection as it seems like pneumonia called novel corona virus. Novel corona virus appeared first time in December 2019 in Wuhan in China. Novel corona virus has four separate families – Alpha, Beta, Gamma and Delta. Alpha and Beta spread through mammals specially Bats. Gamma and Delta type virus spreads via pigs and birds. They have the ability to infect the human beings. These are the viruses which causes the mortality and morbidity in human body. It is a fatal disease that leads to respiratory illness. As per clinical reports common clinical symptoms of corona virus are fever, headache, cough, myalgia along with diarrhoea, nausea, dry cough, conjunctivitis, loss of taste or smell, difficulty in breathing, thorax, discomfort. The risk of the corona virus are prominent in the kids, older people and in the patients those are suffering from the other health problems such as lungs disease, heart disease, cancer and diabetes. The corona virus convinced by the incubation period that is ranging from approximately 2-14 days.

Keyword: Novel corona virus, Pneumonia, Respiratory

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Introduction

China first informed about the viral infection as it seems like pneumonia called novel corona-virus and it was identified as severe acute respiratory syndrome (SARS-COV-2). Novel corona-virus appeared first time in December 2019, in WUHAN (Hubei) province in china.

The virus spread in china within few days and slowly it spreads everywhere in world. From the very beginning the virus was unknown for the human genetical science[1].

Chinese media, clinical and science institutes told that it could react fastly. Now with this latest virus and newly identified genetical structure of the viral genome, over this we would like to share some important points about the novel corona-virus.

On January 30, 2020 WHO planned to broke the dangerous chain of corona-virus[2].

First infected case was found in the food market of the Wuhan. The Corona-virus is the single standard RNA genome which infect the humans as well as animals.

On February 12th, 2020 WHO announced the name of the disease corona-virus disease 2019 (covid-19) which is caused by novel corona-virus.

In 1966 Tyrell and Bynoe first classify and enlightened the patient who is suffering from flu and common cold. The shape of the Corona-virus is the spherical which contains central shell and surface seems like barbed (Latin: corona means crown).

It has four separate families follow as:-

Alpha, beta, gamma and delta; alpha and beta can spread through mammals and specially, its presence will be inside the Bats. Gamma and delta types of corona-virus, usually spreads via pigs and birds.

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Length of the genome ranges between 26kb to 32kb. As they also have their seven sub-types. They have the ability to infect the human beings. Beta corona-virus is considered as very dangerous corona-virus. These are the viruses which cause the mortality and morbidity in human body[3]. SARS-COV-2 virus belongs to the genus beta corona-virus. There are four main operational genes encodes – spike protein (S), nucleocapsid protein (N), membrane glycoprotein (M), small membrane protein (SM). With an additional membrane glycoprotein occurring in the HCoV-OC43 and HKU1 in beta corona virus SARS-COV-2 structure. According to the WHO, presently there is no accurate pharmacological treatment (specially, antibiotics) but we can prevent the migration of the virus inside the human lungs. Chinese medications like; oral administration of protective herbal formulae, herbal fumigations etc, are used to manage the pandemic of corona-virus in china.

Chinese with their herbal and traditional medication are also used in 2003 for the treatment of combat SARS which was very severe infectious disease like pandemic in china before Covid-19.

There are 100 types of viruses which belongs to the family of corona virus. From which there are six types of viruses (229E, NL63, OC43, HKU1, SARS-COV and MERS-COV) which causes mild to severe respiratory tract infections in human[4,5].

First corona-virus (SARS-COV) reported at the end of the year 2002 (November) and Middle East respiratory syndrome (MERS-COV) reported in September 2012.

As this virus came via animals which can cause severe respiratory sickness with heavy mortality rate in the human populations. After few years, this Novel severe acute respiratory syndrome coronavirus-2 (SARS-COV-2) was identified and causes an infectious disease which is known as corona-virus disease[6].

WHO reported 2.1 Millions confirmed cases of corona-virus on 18th April 2020 at 10:00 am as well as 142,229 deaths in 213 countries in World-wide. There were many countries from which more than

30,000 confirmed cases of SARS-COV-2 were came into consideration, including United state of America, Spain, Italy, Germany, France, the United Kingdom, China, Iran, Turkey, Belgium, the Russian Federation, Canada, and Brazil.

Therefore number of cases and its spreadability were continuously increased World-wide and this is of consequence peril in human population health.

Corona-virus (SARS-COV-2) can give major effects in numerous countries of the globe. The effect and presence of this virus was last reported in the Africa continent.

On 18th April 2020 at 10:00am; CDC of Africa reported 19,895 confirmed cases of corona-virus which includes 1,017 deaths and 4,642 recovered cases among 52 African countries. While, still we have two countries of Africa which are free from confirmed cases of corona-virus. Unsurprisingly most cases of corona-virus are recognized in Africa has been migrate from Europe and from the United state, rather than china[7].

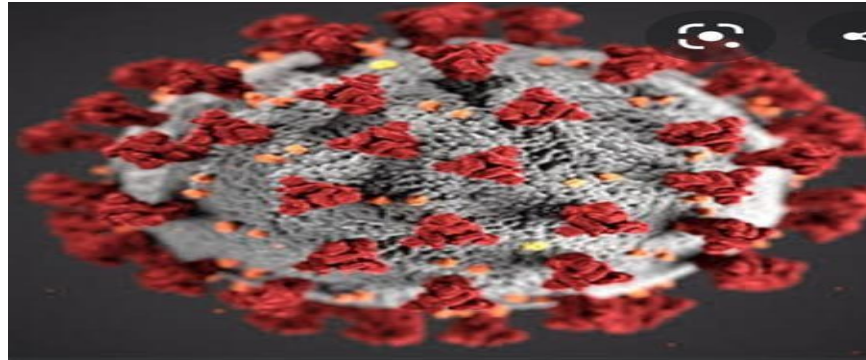


Figure 1: Structure of corona virus

Investigation

1. RT-PCR (reverse transcription polymerase chain reaction)
2. CBC test (complete blood test)
3. CRP test (C-reactive protein)
4. ESR test (erythrocyte sedimentation rate)
5. Chest X-ray (only in few patients)
6. Rapid antigen test
7. D-dimer test
1. **RT-PCR test-** The full form of RT-PCR is reverse transcription polymerase chain reaction. It is a laboratory technique. It is a integrate reserve transcription of RNA into DNA and enlargement of certain DNA target by using polymerase chain reaction. It is firstly used to measure the quantity of a specific RNA.
2. **CBC TEST-**The full form of CBC is complete blood count. It only gives the information about the cells in human blood. CBC shows the amount of WBC (white blood cells), RBC (red blood cells), platelets, hemoglobin concentration, and hematocrit.
3. **CRP TEST-** The full form of CRP test is C- reactive protein test. It is a type of protein which is made by liver. When the CRP level is increased in blood it means there is inflammation is cause in the body. It is used to measure the quantity of CRP in blood to check the inflammation caused by chronic condition (seriousness of disease) or acute condition.
4. **ESR TEST-** The full form of ESR test is erythrocyte sedimentation rate. This is the rate where RBC anti-coagulate

- the whole blood and it starts dropping into the standardized tube in one hour.
5. **CHEST X-RAY-**The chest X-ray is also known as chest radiograph or chest film. This is a chest projection radiograph that is used to see the condition of the chest, to see how much it has had and to see the surrounding structure. Chest X-ray is done on those patients of covid-19 who do not have any other disease like cancer.
 6. **RAPID ANTIGEN TEST-** A rapid test or rapid antigen test is a diagnostic test that results very quickly whether the antigen is in the body or not. This is often used to expose the SARS-COV-2 virus which causes corona-virus.
 7. **D-DIMER TEST-** The d-dimer test is used to help complete blood clot appearance. There are some situations in which d-dimer test is used to help out from the deep vein thrombosis.

Etiology

In previous studies we noticed that the virus share high genome resemblance with 2002 bat derived SARS-Corona virus. Over that it was initially named as the 2019 novel corona-virus. It is RNA based engaged and it has 9-12nm long surface point for solar corona presence Therefore this is named as corona-virus. The genomic structure of Corona-virus appeals inside the cover which has four main structural proteins like- spike protein (S) it binds with the angiotensin converting enzymes-2 (ACE-2) receptors and has moderate fusion between the cell membrane and envelope in the host cell to prevent the virus to reach the host cell[8].

Table 1: Data of covid-19 cases till 18th October 2021

Active cases		Recovered cases	
Currently infected patient-1,494,415		cases which had outcome-705,905	
Mild condition	critical condition	recovered cases	deaths occurred
241,684,065	78,726	217,063,264(98%)	4,917,187(2%)

This is adopted from the top 10 common countries- recorded total no. of infected people, total no. of death cases and total no. of recover cases are there.

Symptoms

Corona-virus is caused by SARS COV-2 virus. It’s a fatal disease that can lead to serious respiratory illness. China is the epicenter of this disease where the first human case of corona-virus was found on December 2019. And further it’s spreads all over the globe. WHO

(world health organization) announced the disease as a global pandemic on 11th march 2020. As per clinical reports, common clinical symptoms of corona-viruses are- fever, headache, cough, myalgia along with diarrhoea and nausea (might be their), dry cough,

conjunctivitis, loss of taste or smell, difficulty on breathing, thorax discomfort (serious symptoms)[9,10]. According to WHO (world health organization) about 2.2 million of people has been infected all over the globe, and about 0.15 million of deaths in world-wide. United States of America who have more than 0.7 millions of people are affected all over the world. Majorly the symptoms appeals to be in the upper respiratory tract and lower respiratory region. The symptoms for covid-19 starts to appear within the first fifth day and it could lead to resist upto fifteenth to eighteenth day (as per the individual physiology). The risk of the corona-virus are prominent in the kids, older people and to the patients which are suffering from the other health problems such as lungs disease, heart disease, cancer and diabetes.

Firstly, this is most important to inform that it is not sure that if the patient which have these types of symptoms have covid-19 because there types of sign and symptoms are also seems in the patient who is suffering with the other viral diseases except breathing and diarrhea problem. Corona-virus could includes greater counts of chemo-kines, cytokines, and leukocytes and high level of plasma pro- inflammatory cytokines and C-reactive protein in there pathological condition. Therefore, depending on the health and age condition of the patient, some patient take more time to recover or some patient can recover easily in short time duration[11].

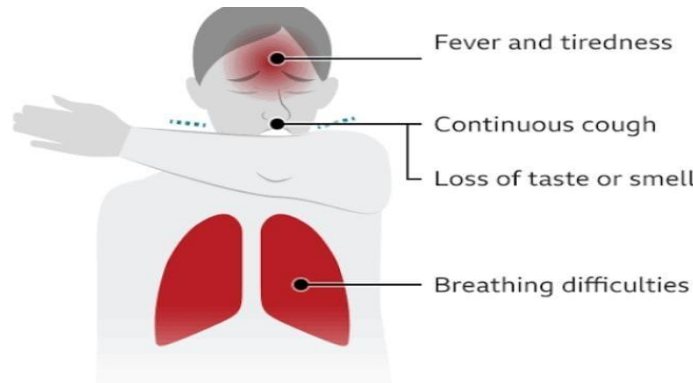


Figure 2: Corona-virus key symptoms

Table 2: These are the common symptoms of covid-19

Serial no.	Symptoms	% (percentage)
1.	Fever	98.6%
2.	Fatigue	69.6%
3.	Dry cough	59.4%

Incubation period for covid-19 patients

The corona-virus convinced by the incubation period which are ranging from approximately 2-14 days (time when infection could be caused to the symptoms could be seems) for reference of following sources:-

1. WHO (world health organization) has already declared the optimum incubation period for corona-virus ranging between 2 to 14 days or 5th to 24th days.
2. At first 10 to 14 days of incubation period can be anticipated by the Chinese National health commission.
3. According to the Centers for disease control and prevention (located in united state of America) the incubation period exist between 2 to 14 days [12].

Table 3: Viruses and their respected incubation periods

Serial no.	Virus	Incubation period
1.	Novel corona-virus	2-14 or 0-24
2.	SARS	2-7 days, as long as 10 days
3.	MERS	5 days, range 2-14 days
4.	Swine flu	1-4 days, as long as 7 days
5.	Seasonal flu	2 days, 1-4 range
6.	Common cold	3-7 days

Epidemiology

On December 2019 the first case of corona-virus patient is reported. Morbidity rate was less at the starting stage of covid-19. Hence, on January 2020 the cases where shoot up rapidly and this became the turning point. Till 23rd January 2020 the virus migrates in entire country of china and further the spreading rate became very fast among the entire world. Over 10,000 cases of covid-19 infection were reported by the WHO (world health organization) for the china till January 2020. In Hubei more than 13332 new cases were found to be reported for the first time on 13th February 2020.

China reported 74,280 cases of infected patient till 19th February 2020 and 924 cases in other 24 countries along with 2009 deaths in worldwide. A total number of infected cases which were declared among the world were 2,200,358 along with 1,494,415 active cases. If we consider the severity of cases then it was found that the mild cases were 1437938 (96%) and severe or critical cases were found to be 56,477 (4%). Sadly the mortality rate were found to be 21% (patients-147787). Before 1st of January 2020, there are 55% of infected cases of covid-19 were found in the wholesale seafood market of Huanan. Although, on 1st December 2019 the first case of human to human infection of covid-19 is seems which don't have link with the seafood market. Due to the spring festival travel season, covid-19 is spread at the other

states of china at the mid of January 2020. The infection of covid-19 is spread from china to other countries through international travelers. Thailand is the first country were the first confirmed infected case of covid-19 is seems outside of china on 13th January 2020. After that on 16th January 2020, the first confirmed case of covid-19 is seems in Japan.

All cases are connected with the wholesale seafood market of Huanan. On January 25th ,2020, the confirmed cases of covid-19 increases upto 2062 as well as 2016 confirmed cases in china, Thailand, Hong Kong, Macau, Australia, Malaysia, Singapore, France, Japan, south Korea, Taiwan, the US, Vietnam, Nepal, and Sweden.

On 30th January 2020, china announced the increase in number of infected cases of covid-19 in more than 18 countries.

So, china announced the public health emergency with the international concern to breakdown the chain of the disease (corona-virus). Till 16th march 2020, the affected cases are increased in the other countries. More than 150 countries and territories are affected with the great breakdown in central china, South Korea, Italy, Iran, France, and Germany.

About 167511 confirmed cases of covid-19 are reported along with 6606 deaths around approximately 8% of mortality rate. The epicenter china reported more than 73% of confirmed cases. These are the number of confirmed cases and deaths could be increased fastly in the other countries and territories.

Number of confirmed case rises from 2798 to 17391 in a week (27th January to 3rd of February) and infected countries can also increase almost doubled (12 to 24). Therefore, quickly enlarge in the number of infected cases and infected countries, WHO (world health organization) announced the disease (covid-19) as a pandemic on 11th of March 2020.

On 13th march 2020, WHO announced Europe the new epicenter of the pandemic due to the more rises of confirmed cases. On 23rd March 2020, Italy declared the excessive number of death cases (5560) followed by china (3276), Spain (1720) and Iran (1685).

After one week on 30th March 2020, the condition of the world’s map of covid-19 has changed i.e., excessive number of cases was declared by the USA (122653) cases and 2112 deaths. Followed by Italy (97689 cases and 10781 deaths), China (82447 cases and 3310 deaths), Spain (78797 cases and 6528 deaths), Germany (57298 cases and 455 deaths), France (39642 cases and 2602 deaths), and Iran (38309 cases and 2640 deaths).

On 6th April 2020 the number of confirmed cases of covid-19 infection are- 1210956 (more than 307318 cases are from USA) and 67594 deaths (maximum number of deaths 15889 are from Italy). After one week on 13th April 2020, number of deaths could be rises 2.5 times more (about 20444 deaths), in the USA itself only[13,14].

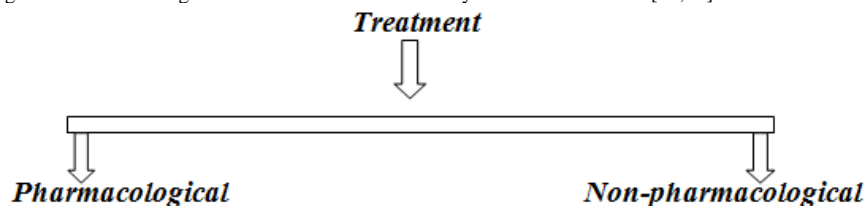
These are the number of confirmed cases, deaths, and infected countries:-

Date	Number of Infected Countries and Territories	Cumulative Confirmed Cases			Cumulative Number of Deaths		
		Globally	China	Outside China	Globally	China	Outside China
13 December-6 January	1	44	44	0	0	0	0
13 January	2	45	44	1	1	1	0
20 January	4	282	279	3	6	6	0
27 January	12	2798	2741	37	80	80	0
3 February	24	17,391	17,238	153	362	361	1
10 February	25	40,554	40,235	319	910	909	1
17 February	26	71,429	70,635	794	1775	1772	3
24 February	30	79,331	77,262	2069	2618	2595	23
2 March	65	88,948	80,174	8774	3043	2915	128
9 March	105	109,577	80,904	28,673	3809	3123	686
16 March	152	167,511	81,077	86,434	6606	3218	3388
23 March	195	332,930	81,601	251,329	14,509	3267	11,242
30 March	204	693,282	82,447	610,835	33,106	3310	29,796
6 April	210	1,210,956	83,005	1,127,951	67,594	3340	64,254
13 April	213	1,773,084	83,597	1,689,487	111,652	3351	108,301

Treatment

In the treatment of corona-virus for the prevention of secondary infection we have to use prophylactic antibiotics. Some combination of antibiotics and antiviral are given orally for the treatment of corona-virus.

A joint research team of shanghai institute of material medica and shanghai tech. university can test the activity of enzyme and conduct a screening of silicon drugs and declared 30 agents which have antiviral activity to cure corona-virus[15,16].



Non-pharmacological treatment

1. Coconut water (in case of dehydration)
2. Citric fruits (boost immunity system)
3. Relaxation therapy
4. Avoid heavy or solid foods
5. Intake maximum fluid to avoid dehydration
6. Take proper steam of plan water
7. Rehabilitations excercises
8. Chronic excercises

Pharmacological treatment

1. Acetaminophel – Paracetamol – for fever
2. Glucocorticoids in case of pulmonary involment (suggestive of ADRs)
3. Anti – cogulation therapy if increased D-Dimer level suggestive of thromblism episodes – to prevent thromblism.
4. Beta – blockers in case of persistence sinus tachycardia along with anti platelets therapy.
5. Anti hypertensives – if patient BP rises.
6. Auto-inhalation – If SPO 2 falls below 95%.
7. Cardiac Protective medications in case of cardiac involment like Beta blockers, anti platelets , Aceptic RBCs and dirutcs if needed,
8. Role of Remdesivir- Anti- viral therapy in moderate to severe cases
9. Ventilator support if needed.
10. Anti- fibrotic therapy – lungs fibrosis growth inhibitor disorder.
11. Tocilizumab – cytokines

Conclusion

Corona-virus is a fatal disease, which have a high mortality rate. There are more 22 lakhs certified cases and more than 10 lakhs deaths are noted in the worldwide. Till know there is no therapy or proven medicines. The committee of United State of America and there experts was developed the guidelines of the treatment for SARS-COV-2 patients[17].

On the basis of human reports and historical records of SARS and the prevention of H1N1 influenza, the effective solution for the prevention of covid-19 is may be Chinese herbal formula. Shortly covid-19 is a highly transmissible disease for the effective vaccines or confirming promising drug conditions clinical trials are required.

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