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THE NOVEL CORONAVIRUS (COVID-19) CAUSATIVE AGENT FOR HUMAN RESPIRATORY DISEASES

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ABSTRACT

The newly founded human coronavirus has named as Covid-19. The full form of Covid-19 is "Co-Corona, vi- virus and d- disease". The Covid-19 is also named as 2019-nCoV because of it was firstly identified at the end of 2019. The coronavirus are the group of various types of viruses i.e. some have positive-sense, single stranded RNA and they are covered within the envelope made up of protein. Still now days seven human coronaviruses are identified are Nl 63, 229E, OC43, HKU1, SARS-CoV, MERS-CoV and latest Covid-19 also known as SARS-CoV-2. From above all, the SARS-CoV and MERS-CoV causes the highest outbreak but the outbreak of Covid-19 is much more than the other any virus. The coronavirus is easily transmitted from person-to-person and hence the World Health Organization called it the pandemic disease. The coronavirus firstly affects the lings of human causing Pneumonia. The major symptoms are cough, sore throat, breathlessness and complete body pain. This virus affects the leukocyte count and platelet count also. This virus affect many organ and organ systems of human body such as kidney, lungs, spleen, etc. and urinary system, Respiratory system. The diagnosis is done by the bacterial and fungal culture and also by the Real Time-PCR technique. The some symptomatic drug treatment are given such as Hydroxychloroquine (HCQ), Clotrimazole, Econazole, Amprenavir (Agenerase), Arbidol, etc. In future some vaccines are may available which are Leronlimab (PRO-140), mRNA vaccine, INO-4800, Remdesivir, etc. Avoid the meeting to infected person, avoid going to infected area, these are the some measures to control the viral infection. In this review article we included the all information about coronaviruses and Covid-19.

KEYWORDS: Covid-19 (2019-nCoV), Respiratory system, Hydroxychloroquine (HCQ), mRNA vaccine, INO-4800, ECMO (Extracorporeal Membrane Oxygenation).

INTRODUCTION

A novel coronavirus, identified as 2019-nCoV, found in Wuhan city of China. This virus was identified at end of November of 2019. At the end of January month of 2020 about more than 1000 cases are identified in all over the world. The number of cases are maximum in China, Italy, United States of America, South Korea, Singapore, France, Nepal, Japan, etc. In the patients who are suffering with coronavirus they have about twenty-four types of respiratory problems. The scientist are still unknown to the 2019-nCoV or Covid-19. The scientist does not know the specific origin of this virus, its genetic structure, its pathogenesis and how it spread from person to person. The increase in number of affected persons or infection is increasing very rapidly because of this virus is easily transmitted from the person-to-person in that manner which infects the large population of world. Before that in 2002 the severe acute respiratory syndrome (SARS-CoV) was found which also cause the very large outbreak in world. IN 2012 the new type of coronavirus is identified that named as Middle East respiratory syndrome (MERS-CoV). The MERS-CoV occurred in the Middle East part of the earth i.e. Russian countries, this virus is also cause the very large outbreak in that area. After all the virus the Covid-19 is the third coronavirus which cause the major and highest number of outbreak or deaths in all over the world. The Covid-19 is also continuously spreds in the world. The Covid-19 puts the global public health is at highest risk. The vaccines for SARS-nCoV and MERS-nCoV was already made but the drug or vaccine on Covid-19 is not prepared still now time.

The virus is originates from the Wuhan city of China. After the first case of 2019-nCoV the China informs the World Health Organization (WHO) about its structure and causative agent. The WHO is the international public health organization who control the all over world's

public health. Then the World Health Organization suddenly issues the guidelines about the Covid-19. In the guidelines of the Covid-19 WHO involves the patient monitoring, collecting the throat sample for the test report. Several countries like United states of America, United kingdom, Italy, Germany, France, this are that countries who are majorly affected by the outbreak of Covid-19. The Covid-19 is more severe than the any other type of coronavirus occur in the past. The maximum outbreak is also of the Covid-19 is registered. According to WHO public health experts found at smokers are majorly affected by severe diseases and 2019-nCoV as compared to non-smoker peoples.

Coronavirus is the large family which infects the many living organisms such as mammals including human being, birds, fishes and animals also. These viruses have been responsible for severe outbreaks in all over the world, including the severe acute respiratory syndrome (SARS) 2002-2003 and the Middle East respiratory syndrome (MERS) outbreak in 2015. The all occurred coronaviruses are shows the pandemic effect on population. The pandemic disease means the disease which spred in all countries in world. Recently the Covid-19 is also known as SARS-CoV-2 or 2019-nCoV which cause the major outbreak in the world. The all types of coronaviruses cause about 24 types of respiratory problems. The coronavirus affects the major systems of our body such as excretory system, cardiovascular system, nervous system and it mainly affects respiratory system of body.

The coronavirus mainly shows the symptoms of pneumonia. After analysis of respiratory samples, the experts at the PRC Centres for Disease Control declared that the pneumonia, later known as novel coronavirus pneumonia (NCP), was caused by a novel coronavirus.[1]

In this review article we discussed in brief about route of transmission, history of coronavirus, background of coronavirus, structure of coronavirus, Genetic makeup, pathogenesis of coronavirus, clinical manifestation of this disease, treatment of 2019-nCov, presentations to stop the spreading of coronavirus, the country wise outbreak of Covid-19 and complications of coronavirus.

Background of 2019-nCoV (Covid-19 / SARS-CoV-2)

The coronavirus is firstly identified in history in 1960's by scientists. The corona virus get its name "corona" because it has the crown ok king like structure. This virus also have the spikes on all over body. The spikes are made up of protein and lipids which acts as a binding site in the host cell. There are many genus seen in coronavirus like *Alphacoronavirus, Betacoronavirus, Gammacoronavirus* and *Deltacoronavirus.* The *Alphacoronavirus* and *Betacoronavirus* affects only the mammals like humans, birds, pigs, rabbits, etc. The *Gammacoronavirus* mainly affects the birds and *Deltacoronavirus* majorly affects the both mammals as well as birds and animals also. [2]

The World Health Organization (WHO) officially named the disease 'COVID-19'. The International Committee on Taxonomy of Viruses named the virus 'severe acute respiratory syndrome coronavirus 2' (SARS-CoV-2). This virus belongs to the family of β-coronavirus, it is large class of viruses that are present in nature. Similar to other viruses, SARS-CoV-2 has many potential natural hosts. The major problem of the Covid-19 is that how to prevent the coronavirus and other is, it is necessary to make treatment on the virus. As compared to Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) the 2019-nCoV is highly transmittable and it is very highly infective also. The mortality rate of 2019-nCoV is highest in history. [3] In the genome analysis of 2019-nCoV is seen that the genome sequence of Covid-19 is similar to the SARS-nCoV and the other coronaviruses found on the bats. Compared to this it is considered that the coronavirus is originates from the bats. [4] According to information published by WHO the first case of Covid-19 was found in Wuhan city of China at the end of November in 2019. Till middle of May month the active cases in all over the world are 25 lakh and the recovered cases are about 17 lakh. The outbreak of Covid-19 up to middle of May month in 2020 are approximately 3 lakh. The active cases in India are 46 thousand. The recovered cases in India are 23 thousand and the death cases are approximately 5 thousand.

Types of Covid-19 (2019-nCov / SARS-CoV-2)

1. Nl 63 (alpha-coronavirus)

HCoV-Nl 63 is the type of coronavirus identified in 2004 in Netherlands. This virus causes bronchiolitis. The Realm of NL 63 is *Riboviria.* The kingdom of this virus is *Orthornavirae.* The phylum of HCoV-NL 63 is *Pisuviricota*. The class is *Pisoniviricetes.* The order of this species is *Nidovirales.* The family of this virus is *Coronaviridae.* The genus is *Alphacoronavirus.* The subgenus of this virus is *Setracovirus.* This is human coronavirus means it affects only the human being and not the animals. The clinical symptoms in HCoV-NL 63 patients are to be fever, cough, rhinitis, sore throat, hoarseness, bronchitis, bronchiolitis, pneumonia, and croup. This virus is easily transmitted from person-to-person. [5] The treatment of this disease is given as symptomatic treatment. Antiviral drugs are also recommended.

2. 229E (Alphacoronavirus)

Another name for 229E virus is HCoV-229E. This type of corona virus mainly affects the humans and bats. This belongs to the beta coronavirus. The realm of 229E coronavirus is *Riboviria.* The kingdom of this virus is *Orthornavirae.* The phylum of this virus if is *Pisuviricota* and class is *Pisoniviricetes.* The order of this virus is *Nidovirales.* This virus is belongs from *coronaviridae* family. The genus of this virus is *Alphacoronavirus* and *Duvinacovirus* is the subgenus. The symptoms of HCoV-229E are series of respiratory symptoms, ranging from the common cold to high-

morbidity outcomes such as bronchiolitis and pneumonia. The medium of transmission of this virus if cough droplets from infected person.[6]

3. HKU1 (Betacoronavirus)

Another name of HKU1 virus is HCoV-HKU1 identified in January 2005 in two patients in Hong Kong. [7] This belongs from the genus of *Betacoronavirus*. The realm of HKU1 type is *Riboviria* and kingdom is *Orthornavirae*. Phylum of this type if *Pisuviricota* family and *Pisoniviricetes* class. The order of this virus is Nidovirales and belongs from *Coronaviridae* family. As the genus is *betacoronavirus*, the subgenus is *Embecovirus.* The main symptom of this virus is bilateral pneumonia, upper respiratory diseases and common cold as a symptom. This virus also affects the bronchioles causing bronchiolitis.

4. OC43 (Betacoronavirus)

The OC43 is a type of human coronavirus. Hence it is also named as HCoV-OC43. It is special type of betacoronavirus 1. This type of coronavirus is firstly identified in 2005. This virus is mainly affects the mammals like human being and cattle's. This coronavirus is an enveloped, positive-sense, single-stranded RNA virus. The realm of this virus is *Riboviria* with kingdom *Orthornavirae* and phylum *Pisuviricota*. The class and order of this virus are *Pisoniviricetes* and *Nidovirales* respectively. The family is *Nidovirales* with genus *Betacoronavirus*. The species of this virus is *Betacoronavirus 1* and sub species is *Human Coronavirus OC43.* This virus can cause severe lower respiratory tract infections, including pneumonia in peoples and the individuals who has low immune power. The peoples those who are taking chemotherapy and who have HIV-AIDS are also majorly susceptible to this virus.[8, 9]

5. MERS-CoV (Betacoronavirus)

The full form of MERS is Middle East Respiratory Syndrome. As the name indicates this virus is majorly affect Saudi Arabia, Jordan, Qatar, Egypt, the United Arab Emirates, Kuwait, Turkey, Oman, Algeria, Bangladesh, Austria.[10] This virus was firstly identified July in 2017 in the affected patient who have the problem for breathing. The relam of this virus is Riboviria. The kingdom is Orthornavirae. The phylum is Pisuviricota. The class is Pisoniviricetes. The order of MERS-CoV is Nidovirales. The family is Coronaviridae. The genus is Betacoronavirus and subgenus is Merbecovirus. The species is Middle East respiratory syndrome-related coronavirus. This virus is also transmitted from person-to-person. [11] The symptoms of this viruses are include fever, cough, diarrhoea and shortness of breath, the infection are Kidney failure, disseminated intravascular coagulation (DIC), and pericarditis.[12]

6. SARS-CoV (Betacoronavirus)

This virus is named as SARS-CoV-1 after the occurrence of Covid-19 (SARS-CoV-2). This virus was firstly identified in 2003. The full form of SARS means Severe Acute Respiratory Syndrome Human coronavirus. It is an enveloped, positive-sense, single-stranded RNA virus which infects the epithelial cells within the lungs. [13] The relam is *Riboviria*. The kingdom is *Orthornavirae*. The phylum is *Pisuviricota*. The class is *Pisoniviricetes*. The order is *Nidovirales*. The family is *Coronaviridae*. The genus is *Betacoronavirus*. The species is *severe acute respiratory syndrome-related coronavirus*. The symptoms of SARS-CoV are muscle pain, headache, and fever, followed by the onset of respiratory symptoms such as cough, dyspnea, and pneumonia. The main symptom is the lymphocyte count is suddenly decreases in infected person.[14,15]

7. Covid-19 (Betacoronavirus)

This virus has many names such as Novel coronavirus, 2019-nCov, SARS-CoV-2, etc. This virus is firstly identified in November 2019 in Wuhan, China. The genus of Covid-19 is *Betacoronavirus* and subgenus is *Sarbecovirus*. The family of this virus is *Coronaviridae* and order is *Nidovirales*. Till now days the vaccine or treatment is does not known, and hence this virus is spreading very rapidly in all over the world. This review paper contains the complete information about Covid-19. In this information paper we discussed in brief about route of transmission, history of coronavirus, background of coronavirus, structure of coronavirus, Genetic makeup, pathogenesis of coronavirus, clinical manifestation of this disease, treatment of 2019-nCov, presentations to stop the spreading of coronavirus, the country wise outbreak of Covid-19 and complications of coronavirus.

Structure of Virion of Covid-19

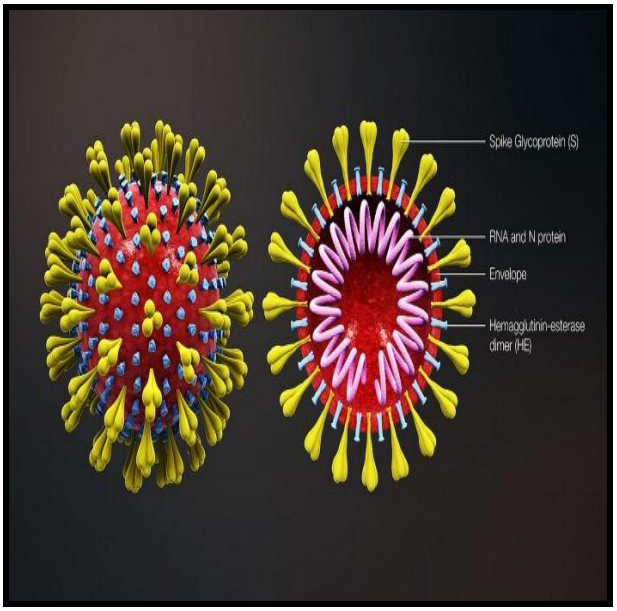


Figure 1: Structure of Virion of Covid-19.

Coronaviruses are single-stranded RNA viruses. SARS-CoV-2, SARS-CoV and MERS-CoV, are β-coronavirus. The genome sequence of SARS-CoV-2 and SARS-CoV-1 is approximately 80% similar. SARS-CoV-2 is closer to the SARS-CoV-1 like other bat coronaviruses.

The outer structure of virion of the Covid-19 (2019-nCoV) is looks like spherical in shape and have diameter approximately 130 nm as identified by the Cryo-Electron Microscopy method.[16] The characteristic feature of novel coronavirus is that they have spikes on their structure made up of proteins and lipids. This spikes are mainly useful for the attachment to the host cell by lock and key system. Due to the presence of this spikes the coronavirus looks like "Crown of the king" and it named as "Coronavirus. Coronavirus have the helically symmetrical nucleocapsid, which is only present in positive-sence RNA and the nucleocapsid is doesn't present on negative sence RNA. The nucleocapsid is protected in the envelope, which act as protecting cover over capsid.

The coronavirus consists of four main types of proteins which are named as Spike (S), Envelope (E), Membrane (M) and Nucleocapsid (N) and the fifth protein is also found which is only found in β-coronaviruses only but not in α-coronavirus named as hemagglutinin-esterase (HE). The four main proteins means Spike (S), Envelope (E), Membrane (M) and Nucleocapsid (N) are encoded at the 3' end of the genome sequence.

1. Spike protein (S-protein)

In many of the coronaviruses the S-protein is present and it is divided into two types of different polypeptide chains which are named as S1 and S2. The S1 part forms the large receptor-binding site or domain in the host cell and S2 part forms the base means stalk of the spike structure. [17, 18] The S-protein get access on the Endoplasmic Reticulum and hence the protein synthesis in hosts cell is completely stops.

2. Envelope protein (E-protein)

The Envelope protein or E-protein are present on the virion but in very minimum amount. The E-protein is present in very divergent form in different virus but all have the approximately similar structure. [19] The E-protein is basically made up of transmembrane protein and it shows the ion channel or ion transfer activity. The some coronaviruses has the recombinant virion structure if that type of viruses does not have the E-protein then they are not always lethal.[20] The function of E protein is that it helps in the assembly of virion and release of virus outside the cell during and after the completing the process of replication. The E protein also have some other functions such as in SARS-CoV the E protein doesn't helps in replication of virus but the E protein is required for the pathogenesis of SARS-CoV.[21]

3. Membrane protein (M-protein)

The M-protein is present in maximum amount in the virion because it is requires for the membrane formation. Due to this the virus get its specific shape.[22] The membrane protein has two parts the larger C-terminal endodomain (inside) and smaller N-terminal glycosylated ectodomain (outside) which extends about 7-8 nm within the virion particle.[23] According to researchers the M-protein acts as a dimer for the virion structure and it also binds to inner nucleocapsid. The many of the M-proteins does not contain any type of genetic information but in some viruses membrane protein may also store genetic sequence.[24]

4. Nucleocapsid Protein (N-protein)

As name indicates the N-protein is only present in nucleocapsid. This protein is subdivided into two types of domains which are N-terminal domain (NTD) and C-terminal domain (CTD). The both NTD and CTD domains are binds with the RNA of host cell but both have the different processes to bind with RNA. But if they want to bind with RNA the both domains are essential it means CTD and NTD are depend on each other. [25, 26] The nucleocapsid have the high affinity towards the hosts RNA.[27] The N protein binds with viral genome RNA with beads-on-the-string type of conformation. For the N protein two specific RNA substrates are found which are as TRS's and genomic packaging signal.[28, 29] The replicase-transcriptase complex (RTC) is formed due to protein-protein interaction between N-protein and M-protein.[26, 30, 31]

5. Hemagglutinin-Esterase (HE)

This is a special type of protein occurs only in β-Coronaviruses. This hemagglutinin-esterase protein is binds with the sialic acid which is present on surface of glycoproteins and contains acetyl-esterase enzyme.

Human Coronaviruses

The human coronaviruses are the main and important cause of outbreak of Covid-19 in all over the world. The all type of human coronaviruses cause the many types of respiratory problems in humans. There are two types of coronaviruses which are α-coronaviruses and β-coronaviruses. The α-coronaviruses HCoV-229E and the β-coronavirus HCoV-OC43 was identified about 80 years ago. [32, 33] the remaining others are identified recently due to their outbreak. This viruses mainly affects the old age peoples and the children's and the peoples who have less immune power. The fantastic thing is that all type of coronaviruses are identified on our planet they all have their different structure.[34, 35] The scientist suggest that the coronavirus causes multiple sclerosis, but till now no any evidence is seen about that.

The SARS-CoV was found in China in 2003. The SARS-HCoV causes the severe acute respiratory syndrome. It was the most severe virus of that time which cause the large outbreak. In that time about 10000 peoples are get infected by this virus and approximately 700 are died.

During that time the researchers found same virus from the some exotic mammals like bats and then it is concluded that this virus is comes from the bats.[36,37,38] Till now days there are three type of bat viruses are identified which are SARS-HCoV, MERS-HCoV and Covid-19 (SARS-HCoV-2). [39] The exact mechanism of infection by this virus is still unknown but the symptoms in both humans as well as animals are age dependent.[40] The vaccine on the SARS-CoV was prepared and hence this virus is doesn't seen again.

But in 2012 the new type of coronavirus was identified named as MERS-CoV (Middle East Respiratory Syndrome) was found in Saudi Arabia, Jordan, Qatar, Egypt, the United Arab Emirates, Kuwait, Turkey and Middle East countries. On that time approximately 900 peoples are infected and about 340 are died. The mode of transmission of this virus is that it is spread from person-to-person. This virus was also found in the camel and the peoples who are get in contact with infected camel it is seen that those peoples are also infected by that virus.[41,42]

The mortality rate of any type of coronavirus which occurs in past is very rapidly override by the Covid-19. Till the middle of May month of 2020 there are about 50 lakh are active cases of Covid-19 and approximately 3 lakh peoples are already died. The virus start to spread from Huanan Sea food market, Wuhan, China. The mortality rate due to Covid-19 is maximum in United States, Russia, Spain, United Kingdom, Italy, Germany, Brazil, Turkey, France, Iran, Mainland China, India, etc.

Replication of Covid-19

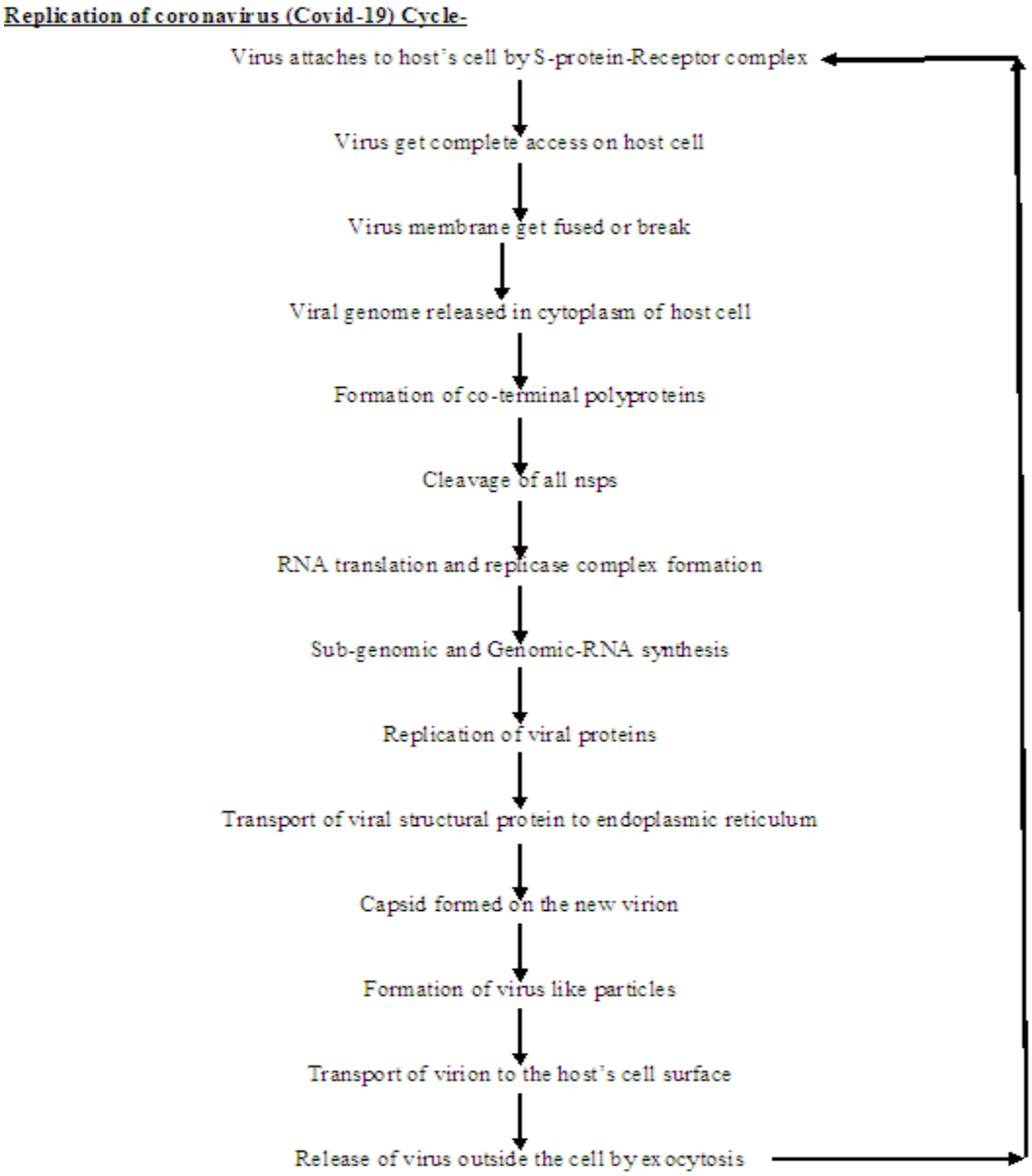
The complete process of replication of coronavirus is as follows, In first step the virus attaches to hosts cell due to interaction between S-protein and host cells receptor, they both works as a lock and key manner. The most of the α-coronaviruses uses the aminopeptidase N (APN) for their receptor and SARS-CoV and HCoV-NL63 uses angiotensin-converting enzyme 2 (ACE2) to attract the receptor. MERS-CoV uses the dipeptidyl-peptidase 4 (DPP4) for attachment to the hosts cell. When the virus binds to the host's cell the virus get complete control on that call. The in next stage the outer cover of virus get fused. In some cases the fusion of virus membrane is caused due to acidified endosomes but in some cases the virus membrane is get directly fused with the plasma membrane of host's cell. Due to fusion of virus membrane the viral genome is get mixed with cytoplasm of host cell. [43] In next step the translation of viral RNA occurs to form the replicase gene. Then the replicase gene forms the rep1a and rep1b this both are very helpful for synthesis of two polyproteins which are pp1a and pp1ab. For the formation of this two polyproteins, viruses use special type of genetic codon sequence which 5′-UUUAAAC-3' which shifts the ribosomal from rep1a to rep1b. Sometimes the pseudo knot block the ribosomal elongation due to this the translation of pp1ab completes.[43]

The both of polyproteins pp1a and pp1ab consists of nsps 1-11 and nsps 11-26 respectively. The nsps 1-11 is get converted into nsp 12. But the coronaviruses forms only two or three protease enzymes which causes the cleavage in to the all protease polyproteins. The examples of protease polyproteins are PLpro and Mpro which are nsp3 and nsp5 respectively. The PLpro causes the cleavage in between three nsps i.e. nsp 1 and nsp 2, nsp 3 and nsp 4, nsp 5 and nsp 6. The other all remaining polyproteins are cleavage by the Mpro.[32]

Then in the next step the all of the nsps are get accumulate in to the replicase-transcriptase complex (RTC), where the environment is made suitable for the synthesis of RNA of virus. The nsps contains the all enzymes which are essential for the synthesis and replication of viral RNA. When the RNA translation process is get complete the formation of viral replicase complex is get initiate. When the production of viral RNA is in work the two products are formed named as genomic-RNA and sub-genomic-RNA. The sub-genomic RNA are work as an mRNA which helps for the building of structure of the replicasepolyprotein in host's cell. From the negative strand of intermediate product genomic-RNA and sub-genomic-RNA are formed. The total quantity of negative strand intermediate within the viral RNA is only about 2-3%. The pseudo knot and the stem loop at the 3' end are couldn't synthesised simultaneously because there are chances of overlapping of those on each other and this may cause the stopping of viral RNA synthesis.[32]

After the completion of synthesis of genomic-RNA and Sub-genomic-RNA and complete replication of viral structural proteins, the all the material is transported to endoplasmic reticulum (ER) of the host's cell. At the endoplasmic reticulum the viral genome is capsulated means capsule is formed by in the presence of nucleocapsid protein (N-protein). After that the viral genome is converted into mature virion.[32]

The M-protein (membrane protein) helps in the formation of virus like particles. The virus like particles form the envelope around the coronavirus. Then in the last step the Nucleocapsid and M-protein binds with each other which is the manifestation of ending of replication of virus process. After that the virion is transmitted towards the cell wall of host's cell and expelled out by the process of exocytosis.[32]



METHOD

Study design and participants

For this retrospective and single-centre study, we chosen the patients which are having the 2019-nCoV. All patients who have diagnosed as having 2019-nCoV coronavirus according to WHO were collected in this informative study. The data which collected is given by WHO.

Procedure

For the detection of coronavirus the sample is taken which is throat swab of some patient, who's the coronavirus test is positive and they are suffered with Covid-19. The test use for detection of Covid-19 is Real Time-PCR technique. By using the RT-PCR technology we can also identify the other diseases like SARS-CoV, MERS-CoV, etc. [44] In the Covid -19 the pneumonia is common symptom which is examined by CT-scan and chest X-ray.

Outcomes

In this review article we enlisted the demographic data, signs and symptoms, laboratory results, infections to respiratory system and treatment which are till now is known.

Spread of Covid-19 virus

Covid-19 is majorly spread by the cough or sneeze droplets of infected person. There are two ways by which the coronavirus can infect the other people: One can infected by being very closer to the infected person about less than the 1 meter. The chances of getting infected is more increases when you doesn't wear the mask on face during coughing and sneezing. The touching the infected surface is also gives the high risk to get infected.

Experts believes that the coronavirus spreads from person to person by following ways: Droplets, Airborne transmission, Surface transmission, Fecal-Oral route, etc.

At this time, some peoples have the very high risk of the infection which are healthcare workers for the Covid-19 patients and other close relatives of the patients.

Clinical manifestation of Covid-19

- Cough
- Runny Nose
- Fever
- Bacterial Co-infection
- Lymphopneia
- Multilobularinfiltration
- Body Pain
- Dry Cough
- Shortness of breath
- Sore throat
- Headache
- Confusion
- Nausea and vomiting
- Vomiting
- Muscle ache
- Nervous system diseases
- Endocrine system diseases
- Exacerbated asthma
- Malignant tumour
- Digestive system diseases
- Multiple mottling and ground-glass opacity
- Cardiac Shock
- Pneumonia
- Acute real injury
- ARDS
- Damage to respiratory system

In the Chest CT Scan of Covid-19 patients some symptoms are as given in table. In that CT scan the all things are get known to the researchers. The following terms are about the lungs.

CT Findings	Frequencies (%)
Ground-glass opacity	86%
Bilateral Distribution	76%
Peripheral Distribution	33%
Crazy-daving	19%
Cavitation	0%

Treatment on Covid-19

There is no any specific treatment available on Covid-19 infection. Avoiding the meeting with peoples or not involve in the crowd is the best practice to avoid the infection of 2019-nCoV.

1. Antibiotic drug treatment e.g. - Hydroxychloroquine, Quinine, Quinolones, Penicillin, Amoxicillin, Ciprofloxacin, Doxycycline, Sulfamethoazole.
2. Antifungal drug treatment e.g. – Clotrimazole, Econazole, Miconazole, Fluconazole, Ketoconazole, etc.
3. Antiviral drug treatment e.g. – Abacavir, Amantadine, Amprenavir (Agenerase), Arbidol, Atazanavir, etc.
4. CRRT (Continuous Renal Replacement Therapy)
5. ECMO (Extracorporeal Membrane Oxygenation)
6. Altimmune is pharmaceutical industry working on preparation of vaccine on Covid-19 named as 'AdCovid'. This vaccine is in preclinical trial phase.
7. BioNTech and Pfizer is working on preparation of effective vaccine on Covid-19 named as 'mRNA Vaccine'. This drug is in 2nd phase of trial.
8. CytoDyn is a biotechnology company who testing for drug 'Leronlimab (PRO-140)' for Covid-19 patients.
9. Gilead Sciences Inc. developing the drug which can be cure against Covid-19 named as 'Remdesivir'. This drug is authorised for emergency use by Food and Drug Administration of US.
10. Inovio Pharmaceuticals is testing its vaccine candidate in a phase one clinical trial, the name of drug is 'INO-4800'.
11. As there is no specific treatment is evolved until now days, hence include symptomatic drug medication, self-care and over-the-counter (OTC) drug medication. Peoples can follows the following steps to avoid to get infected by Covid-19 virus.

- Stay home and avoid the meeting with other peoples
- Avoid smoking and Smokey areas.
- Take suitable medication for the pain and fever.
- Using a clean humidifier or cool mist vaporizer
- Standard recommendations to prevent infection spread
- Drinking enough water.
- Avoid going to crowded places.
- Use surgical mask when going out of home.

Lifespan of 2019-nCoV at different conditions on several surfaces and in the air

The lifespan of Covid-19 viruses depends on the ambient conditions of the surface and several parameter such as temperature, humidity, etc. The lifespan of Covid-19 virus in the air is 3 hours. The resulting table from experiment shows the lifespan of Covid-19 virus at temperature near to 24^0C and relative humidity 65% conducted by scientist.

Surfaces	Example	Lifespan
Metal	Doorknobs, Jewellery, Silverware	5 days
Wood	Furniture, Decking	4 days
Plastic	Milk Containers, Detergent bottle, subway, Bus seats, Backpacks, Elevator	2 to 3 days
Stainless steel	Pans, Refrigerators, Pots, sinks	2 to 3 days
Cardboard	Shipping Boxes	24 hours
Copper	Cookware, teakettles, pennies	4 hours
Aluminium	Soda cans, Tinfoil, Water bottles	2 to 8 hours

Glass	Drinking glasses, Measuring cups, Mirror, Windows	Up to 5 days
Ceramic	Dishes, Pottery, Mugs	5 days
Paper	Newspaper, Mail	Up to 5 days
Food	Produce, Takeout	Not sure
Water	-	Not sure

Statistics of infected, recover and outbreak patients worldwide

The following data is valid up to 13th May 2020

Country	Total Patients	Recovered	Died
United States	1,410,168	296,746	83,491
Spain	271,095	183,227	27,104
Russia	242,271	48,003	2,212
UK	229,705	N/A	33,186
Germany	173,538	148,700	7,780
Iran	112,725	89,428	6,783
China	82,926	78,189	4,633
India	75,048	24,900	2,440
Belgium	54,981	13,937	8,843
Saudi Arabia	44,830	17,622	273
Netherland	43,211	N/A	5,562
Mexico	38,324	25,935	3,926
Pakistan	34,336	8,812	737
Switzerland	30,413	26,800	1,870
Singapore	25,346	3,851	21
Bangladesh	17,822	3,361	269
Poland	17,062	6,410	847
Israel	16,539	12,173	262

RESULT

The Covid-19 has the greatest outbreak as seen in our human history. The information in this study are collected from the report of Covid-19 infected patients. And in the result we collect the all information which is given in following.

The Covid-19 mainly affects the old age peoples and the children's. The old age peoples majorly has their age above 60 years. The patients some respiratory problems like fever, cough and difficulty in breathing. The some other symptoms seen in some patients are headache, confusion, diarrhoea and high chest pain and some of the patients also have organ function damage, acute respiratory diseases, acute renal diseases and symptoms associated with pneumonia. It is seen that in the Covid-19 patients leukocyte count was decreases but in some cases it may remain at normal level and may increases. The virus also decreases the level of the blood Haemoglobin which results that the patient suffers from hypoxia and ischemia. [45] The severe liver damage is also seen in most of the patients and especially in the drinkers and smokers. It is seen that many of the patients suffering with changing level of creatinine kinase and lactate dehydrogenase.

For the diagnosis of Covid-19 the X-ray and CT-Scanning is carried out. According to chest X-ray and CT scan we found some cases of pneumothorax, unilateral pneumonia and some cases of bilateral pneumonia. . The main complication of Covid-19 is Pneumonia. The bacteria and fungal as well as urine culture is also carried out for diagnosis of 2019-nCoV. The example of bacteria which are used for bacterial culture are *Acinetobacterbaumannii*, *Aspergillusflavusare*, etc.

When any person is get infected by the Covid-19 virus, the main symptom is that the patient get breathlessness due to the infection to the bronchioles in the lungs and hence firstly when the patient get admitted in the hospital the patient keeps on the ventilator to avoid the breathing problem of patient. The Covid-19 also affect the other body systems such as excretory system, Urinary system, Respiratory System, etc. Hence the dialysis is required for that patients whose kidney get failed and stop working. In the drug treatment, the anti-Covid-19 vaccine is not prepared and hence symptomatic treatment used. The doctors and health workers suggest to take antibiotic tablet in single or in combination mode such as methylprednisolone Tephalosporin, Tigecycline, Carbapenemes, etc. The antifungal drug treatment is also suggested to the some patient of Covid-19 such as methylprednisolone sodium succinate.

To stop the spreading of coronavirus we have to us the given steps; stay home and avoid crowd, avoid smoking and alcoholism, use the surgical face masks, avoid to meet that person who have symptoms like coughing and sneezing.

The number of Covid-19 is much more in complete world. If the doctors give the symptomatic treatment to the patients then some patient are get cured also but some patient are died due to inability of doctors to cure the hypoxia of that patient. The patients are also died due failure of respiratory system, failure of urinary system and main complication is Pneumonia. Approximately most of the patients are died due to the patients who died they have the lymphopenia, hypertension and pneumonia and due to high alcoholism and ciggarate smoking.

CONCLUSION

The infection Covid-19 is clustering onset means that this disease is rapidly spreads into crowdie areas. The Covid-19 is person-to-person transmitted. The Covid-19 will continue to evolution and infects the both humans as well as animals. The outbreak means the death rate is very high due to their ability to recombine, mutate, and infect multiple species and cell types. This Covid-19 virus firstly affect the lung due to which the person get

suffocated and fell uncomfortable. It mainly affects the respiratory system and causes diseases like ARDS or Pneumonia. The coronavirus affects the many body parts of body i.e. lungs, kidney, heart, liver, etc., this all given organs are may fail due to severe or last stage of coronavirus. Finally, if we become the pathogenesis of coronavirus, complete genome and genomic structure of coronavirus it will significantly improve our ability and knowledge to make vaccine against Covid-19.

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