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COVID-19: OUTBREAK OF A NEW PANDEMIC

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ABSTARCT

COVID-19 (Coronavirus disease 2019) is a infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), previously named as novel coronavirus 2019 (2019-nCoV), a strain of coronavirus. As per the report WHO declared this outbreak as a pandemic because it became a serious issue to public health and reiterated the call for countries to take immediate actions to scale up to treat, detect and control the transmission. In the last 20 years, several viral epidemics came out such as the severe acute respiratory syndrome coronavirus (SARS-CoV) in 2002–2003, and H1N1 influzena in 2009, have been recorded. Mostly recently, the Middle East Respiratory Syndrome coronavirus (MERS-CoV) was first identified in Saudi Arabia in 2012. In a timeline that reaches the present day, an epidemic of cases with unexplained low respiratory infections was first reported to the WHO country office in China, on December 31, 2019. And it was presented as all this started from the Human Seafood Wholesale Market of Wuhan (China).

KEYWORDS: Coronavirus, COVID-19, Syndrome, Novel, Transmission, MERS-CoV, SARS-CoV.

INTRODUCTION

The pandemic caused due to coronavirus reffered to as COVID-19 has its root linked with the group of viruses that cause diseases in mammals and birds. The name coronavirus is derived from Latin word corona, meaning “crown or wreath”. The coronaviruses were first discovered in 1930 when an acute respiratory infection of chicken which was caused by infectious bronchitis virus (IBV). In human it was first reported in 1960 which was later named as human coronavirus 229E and human coronavirus OC43. other identified virus include SARAS-CoV in 2003, HCoV NL63 in 2004, HKU1 in 2005, MERS-CoV in 2012 and the most deadliest which became pandemic is SARS-CoV-2 in 2019. The SARS-CoV-2 infection is a type of pneumonia that’s been called 2019 novel corona virus. As per the initial source the first case of the COVID-19 was linked with the direct exposure of Human to Seafood Wholesale Market of Wuhan(China) also called as wet market, where the animal to human transmission was presumed as the main mechanism. Number of cases related with COVID-19 in province soar to nearly 50,000 as new diagnostic methods are employed. COVID-19 stand for corona virus diseases which is discovered in 2019 spread from the animal to the human being. Incubation period estimate the immunity of the people. Countries and territories which are affected by COVID-19 are 29. According to WHO early estimate of fatality rate near about 2% till Feb. 2020 studies. In below figures 1&2, the viral structure shows the positive single stranded RNA- having spikes to connect the surface of the cell without entering the nucleus starts the replication.[1,2,3,4]

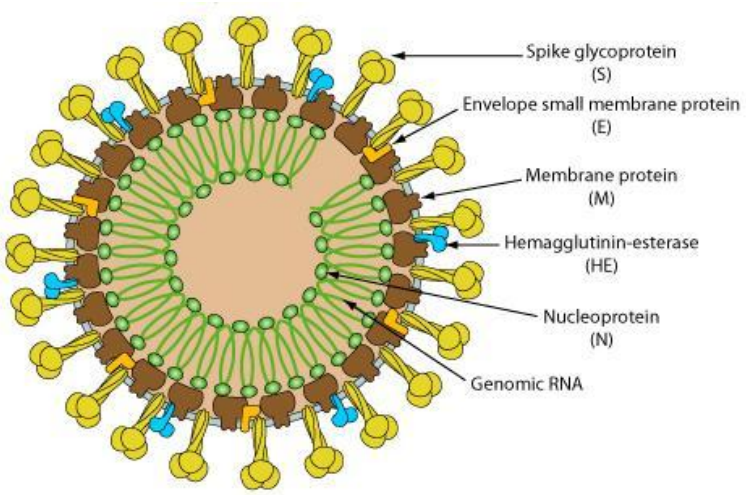

Figure 1: Longitudial microscopic structuure of Coronavirus.[5]

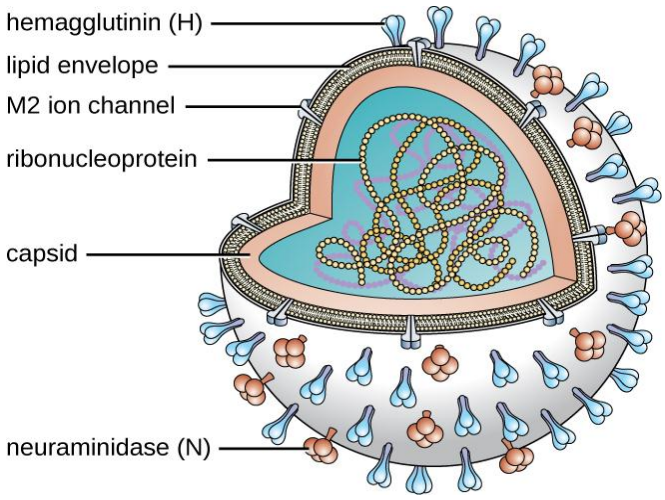

Figure 2: Transverse microscopic structuure of Coronavirus.[6]

WHAT IS THE SIGNS AND SYMPTOMS?

Common symptoms at onset of illness-

- Fever, Flu like symptoms such as coughing, sore throat and fatigue;
- Shortness of breath, Mild pneumonia in both lungs (chest pain),[7,8,9,10,11]

Less common symptoms are

- sputum production (coughing up material),
- headache,
- haemoptysis (coughing up blood),
- diarrhoea, vomiting, abdominal pain, nausea
- Muscle pain (Myalgia),
- confusion,
- rhinorrhea (runny nose),
- blue lips or face.[9,10]

DIFFERENCE BETWEEN COVID-19 AND COMMON COLD FLU

When you have symptoms, they can be similar to a bad cold or the flu. Your doctor will suspect COVID-19 if you have a fever and breathing problems and you've travelled to places where the infection has already spreaded. Because you've been exposed to people who have it within the last 14 days. Influenza tends to cause much more body pain and the COVID-19 virus tends to feel much more like the common cold with fever, cough, runny nose and diarrhoea.[12,13] Officials are urging anyone who develops possible symptoms of the novel coronavirus to contact health care providers to inquire about next steps and possible testing, but with millions infected by the influenza virus and COVID-19., many are wondering how to tell the difference between the two.[14]

Part of the worrying element for some is the difficulty in disgusting symptoms of corona virus to that of the common cold or flu. The list of 3 main symptoms of corona virus:

- A cough
- A high temperature
- Shortness of breath with the cough.[12]

Because these symptoms are very similar to a regular cold, it's is important to know when to double check and not just assume you'll get over it in a few days. "However, in a small portion of the population with either COVID-19 or influenza, symptoms progress to

kidney failure and respiratory failure." So the little difference shown in the below figure 3 about cold, flu or COVID-19.

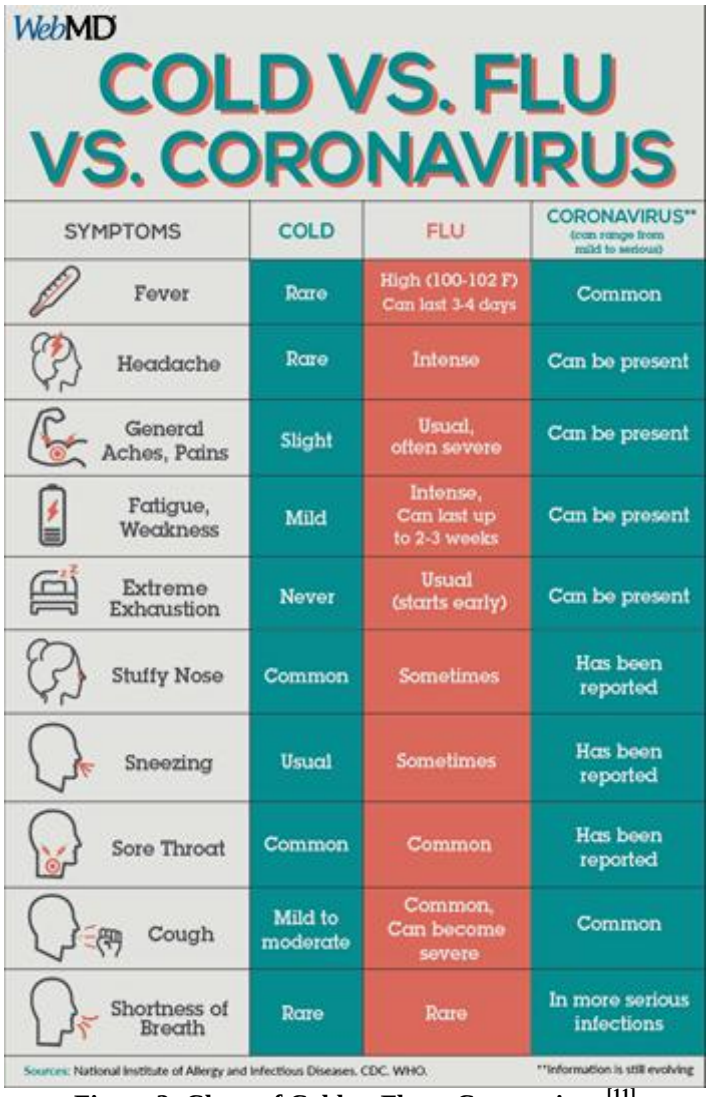

Figure 3: Chart of Cold vs Flu vs Coronavirus.[11]

TRANSMISSION OF CORONA VIRUS

Corona virus can live longer than that of other flu. Overall flu virus stays live for 2-3 days. This not only spread by contagious people but also from non living things. It is not certain how long the virus that causes COVID-19 surfaces on surfaces, but it seems to behave like others corona viruses which is spread by coughing and sneezing, then droplets transmitted to person to person.[7,11,15,16] Studies suggest that corona viruses may persist on surfaces for a few hours or upto several days. This may be varying under different situation; such as type of surfaces, temperature, humidity, weather, etc. Corona virus live upto for a day or 9 days and stay in 4 degree or maybe more than 30 degree or less.

- On stainless steel or plastic like hard surfaces it may live for upto 72 hours,
- On clothes it survive for upto several days is not washed,
- On phone screen it survive upto 96 hours,
- On cardboard for upto 24 hours.[12]

If you assume that surface may be infected, clean it with simple disinfectant to kill the viruses and protect yourself and others. Wash your hands with soap or water, but if you are outside you alcohol based sanitizer to disinfect your hands. Strictly avoid touching your eyes, mouth or nose.[17]

WHAT IS THE ESTIMATED INCUBATION PERIOD OF THE COVID-19?

The "incubation period" means the development of the infectious diseases from the entrance of the pathogen like virus to the appearance of the clinical symptoms. Most estimate range of covid-19 incubation period is from 2-14 days, most commonly around 5 days. The best observed value for infection has been estimated to have a mean incubation period of 6.4 days and a basic reproduction number of 2.24-3.58. It refers that one

infected individual may spread the infection to 2-3.5 individual. These estimates will be updated as more data become available.[13,17,18,19,20]

HOW REPLICATION OCCURS IN THE HUMAN BODY?

Coronaviruses are large, enveloped RNA viruses. Viral family has intensified in the past few years as a result of the identification of a newly emerged coronavirus as the causative agent of severe acute respiratory syndrome (SARS). The newly identified coronavirus, SARS-CoV-2 (2019-nCoV), has led to pneumonia (COVID-19) that sickened over 240,000 people worldwide. SARS-CoV-2 belongs to the Betacoronavirus Genus, which also includes SARS CoV (2003) and MERS CoV (2012). Same as all other coronaviruses, the genome of SARS-CoV-2 (2019-nCoV) encodes the spike protein, the envelope protein, the membrane protein, and the nucleocapsid protein.[18,19]

Coronavirus replication entails ribosome frameshifting during genome translation, the synthesis of both genomic and multiple subgenomic RNA species, and the assembly of progeny virions by a pathway that is unique among enveloped RNA viruses. The coronavirus genomic RNA of approximately 30,000 nucleotides encodes structural proteins of the virus, nonstructural proteins that have a critical role in viral RNA synthesis and nonstructural proteins that are nonessential for virus replication in cell culture but appear to confer a selective advantage in vivo (which we will refer to as niche-specific proteins). At least one niche-specific protein, nonstructural protein 2 (nsp2), and one structural protein, the nucleocapsid protein (N), are involved in viral RNA synthesis.

Attachment and entry

The initial attachment of the virion to the host cell is initiated by interactions between the **S** protein and its receptor. The sites of receptor binding domains (RBD) within the S1 region of a coronavirus S protein vary depending on the virus, with some having the RBD at the C-terminus of S1 (SARS-CoV).[8,21]

The S-protein/receptor interaction is the primary determinant for a coronavirus to infect a host species and also governs the tissue tropism of the virus. Many coronaviruses utilize peptidases as their cellular receptor. It is unclear why peptidases are used, as entry occurs even in the absence of the enzymatic domain of these proteins.[22]

Replicase Protein Expression

The next step in the coronavirus lifecycle is the translation of the replicase gene from the virion genomic RNA. The replicase gene encodes two large ORFS, rep1a and rep1b, which express two co-terminal polyproteins, pp1a and pp1ab.[23,24] Polyproteins pp1a and pp1ab contain the nsps 1–11 and 1–16, respectively. In pp1ab, nsp11 from pp1a becomes nsp12 following extension of pp1a into pp1b. These polyproteins are subsequently cleaved into the individual nsps.[25] Coronaviruses encode either two or three proteases that cleave the replicase polyproteins. They are the papain-like proteases (PLpro), encoded within nsp3, and a serine type protease, the main protease, or Mpro, encoded by nsp5. Next, many of the nsps assemble into the replicase-transcriptase complex (RTC) to create an environment suitable for RNA synthesis, and ultimately are responsible for RNA replication and transcription of the sub-genomic RNAs. The nsps also contain other enzyme domains and functions, including those important for RNA replication.[26]

Replication and Transcription

Viral RNA synthesis follows the translation and assembly of the viral replicase complexes. Viral RNA synthesis produces both genomic and sub-genomic RNAs. Sub-genomic RNAs serve as mRNAs for the structural and accessory genes which reside downstream of the replicase polyproteins. All positive-sense sub-genomic RNAs are 3′ co-terminal with the full-length viral genome and thus form a set of nested RNAs, a distinctive property of the order *Nidovirales*. Both genomic and sub-genomic RNAs are produced through negative-strand intermediates. These negative-strand intermediates are only about 1% as abundant as their positive-sense counterparts and contain both poly-uridylate and anti-leader sequences.[27] Many cis-acting sequences are important for the replication of viral RNAs. Finally, coronaviruses are also known for their ability to recombine using both homologous and non-homologous recombination.[28,29] The ability of these viruses to recombine is tied to the strand switching ability of the RdRp pause from the current model. Recombination likely plays a prominent role in viral evolution and is the basis for targeted RNA recombination, a reverse genetics tool used to engineer viral recombinants at the 3′ end of the genome.

Assembly and Release

Following replication and subgenomic RNA synthesis, the viral structural proteins, S, E, and M are translated and inserted into the endoplasmic reticulum (ER). These proteins move along the secretory pathway into the endoplasmic reticulum-Golgi intermediate compartment (ERGIC).[30,31] There, viral genomes encapsidated by N protein bud into membranes of the ERGIC containing viral structural proteins, forming mature virions.[32]

The M protein directs most protein-protein interactions required for assembly of coronaviruses. However, M protein is not sufficient for virion formation, as virus-like particles (VLPs) cannot be formed by M protein expression alone. However, when M protein is expressed along with E protein VLPs are formed, suggesting these two proteins function together to produce coronavirus envelopes.[33] N protein enhances VLP formation, suggesting that fusion of encapsidated genomes into the ERGIC enhances viral envelopment.[34] The S protein is

incorporated into virions at this step, but is not required for assembly. The ability of the S protein to traffic to the ERGIC and interact with the M protein is critical for its incorporation into virions.

While the M protein is relatively abundant, the E protein is only present in small quantities in the virion. Thus, it is likely that M protein interactions provide the impetus for envelope maturation. It is unknown how E protein assists M protein in assembly of the virion, and several possibilities have been suggested.[35,36,37] Some work has indicated a role for the E protein in inducing membrane curvature, although others have suggested that E protein prevents the aggregation of M protein.[38] The E protein may also have a separate role in promoting viral release by altering the host secretory pathway.[39]

The M protein also binds to the nucleocapsid, and this interaction promotes the completion of virion assembly. These interactions have been mapped to the C-terminus of the endodomain of M with CTD 3 of the N-protein.[40] However, it is unclear exactly how the nucleocapsid complexed with virion RNA traffics to the ERGIC to interact with M protein and become incorporated into the viral envelope. Another outstanding question is how the N protein selectively packages only positive-sense full-length genomes among the many different RNA species produced during infection. A packaging signal for MHV has been identified in the nsp15 coding sequence, but mutation of this signal does not appear to affect virus production, and a mechanism for how this packaging signal works has not been determined.[41] Furthermore, most coronaviruses do not contain similar sequences at this locus, indicating that packaging may be virus specific.

Following assembly, virions are transported to the cell surface in vesicles and released by exocytosis. It is not known if the virions use the traditional pathway for transport of large cargo from the Golgi or if the virus has diverted a separate, unique pathway for its own exit. In several coronaviruses, S protein that does not get assembled into virions transits to the cell surface where it mediates cell-cell fusion between infected cells and adjacent, uninfected cells. This leads to the formation of giant, multinucleated cells, which allows the virus to spread within an infected organism without being detected or neutralized by virus-specific antibodies.[42]

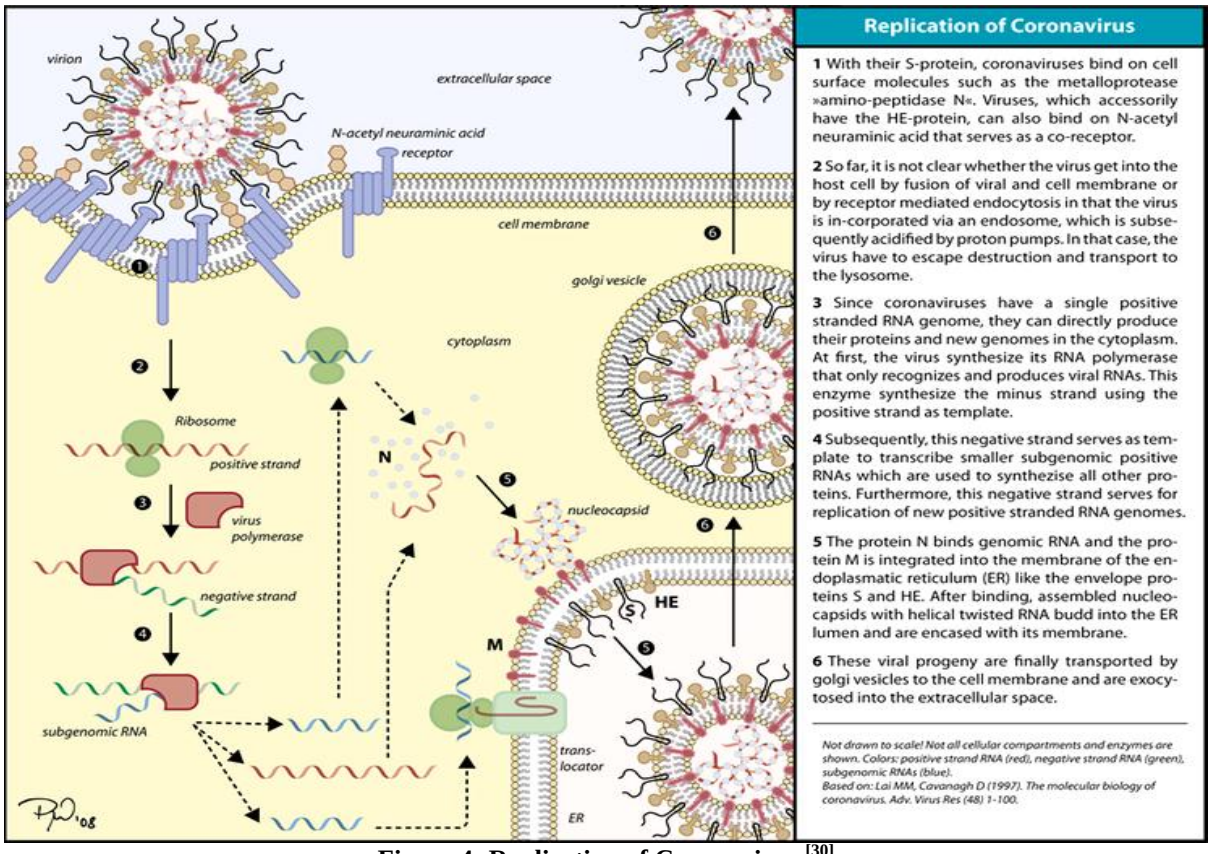

Figure 4: Replication of Coronavirus.[30]

HOW MANY DIVERSITY OF THE CORONA VIRUS?

Corona viruses are a large family of viruses that are common in animals. Different CoVs show diverse host range and tissue tropism. Some of the known CoVs infection connection are, *alphacoronaviruses* and *betacoronaviruses* infect mammals. Where as in contrast to it, *gammacoronaviruses* and *deltacoronaviruses* infect birds and fish, but some of them can also infect mammals.[3,43] Before 2019, there were only six CoVs that were known to infect human and cause respiratory diseases. HCoV-229E, HCoV-OC43, HCoV-NL63, and

HKU1 cause only mild upper respiratory disease, and in rare cases some of them can cause severe infection in infants, young children and elders. SARS-CoV and MERS-CoV can infect lower respiratory tract and cause severe respiratory syndrome in human.[44,45] Some CoVs can infect livestock, birds, bats, mice, whales, and many other wild animals, and they can cause great economic loss. For example, in 2016, an HKU2-related bat CoV, swine acute diarrhea syndrome CoV, caused a large-scale outbreak of fatal disease in pigs in Southern China, and more than 24 000 piglets were dead.[46,47,48,49] This is the first documented spillover of a bat CoV that caused severe disease in livestock.[3]

The new CoV, 2019-nCoV, which belongs to *betacoronaviruses* based on sequence analysis, can also infect the lower respiratory tract and cause pneumonia in human, but it seems that the symptoms are milder than SARS and MERS. Occasionally, people get infected with these viruses which may then spread to other people. For examples, SARS-CoV was associated with the civet cats in China 2003 and MERS-CoV is transmitted by dromedary camels in Saudi Arabia 2012. Possible animal sources of COVID-19 have not yet been confirmed. The below figure 5 show the varieties of corona viruses:-

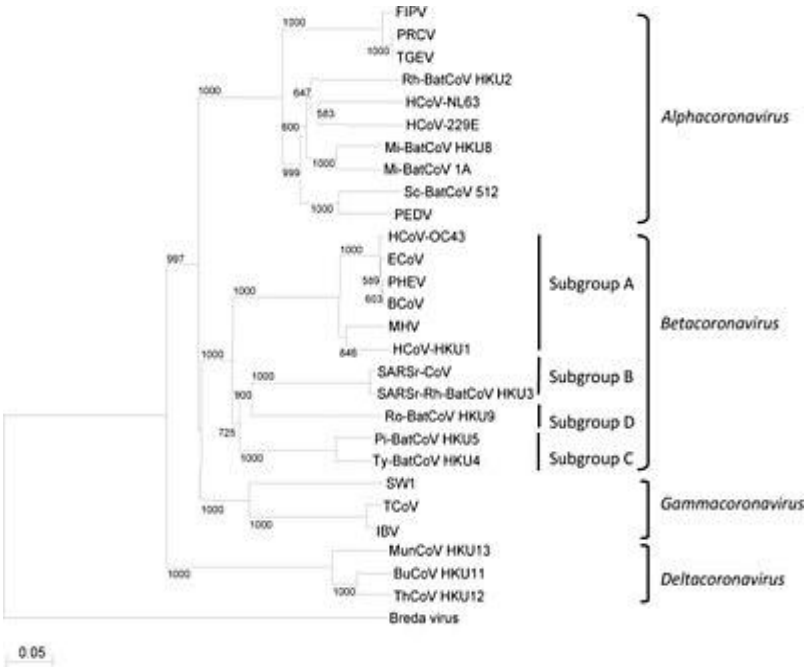

Figure 5: Varities of Coronavirus.[48]

HOW DANGEROUS IS THE VIRUS?

Illness due to COVID-19 infection is generally mild, especially for children and young adults. However, it can cause serious illness: - about 1 in every 5 people who catch it needs the hospital care. It is therefore quite normal for people to worry about the COVID-19 pandemic (a diseases that spreads over a whole country or the whole world) will affect them and their loved ones.[20,51]

There are 3 methods to understand in order to assess the magnitude of the risk posed by the covid-19.

1. Transmission rate (Ro) – number of newly infected people from a single case.
2. Case fatality rate (CFR) – percent of cases that result in death.
3. Determine the asymptomatic transmission is possible.[13]

WHO IS AT RISK OF DEVELOPING SERIOUS ILLNESS?

Results from a 2020 study of 138 people admitted into hospitals in Wuhan, China, with NCIP found that 26 percent of those admitted had severe cases and needed to be treat immediately in ICU (intensive care unit). About 4.3 percent of those people who were admitted to the ICU died from NCIP. It should be noted that the people who were admitted to the ICU were on average older and had more underlying health conditions than people who didn't in the ICU.[10,49,50,52]

COVID-2019 affects people globally, but older persons and persons with pre-existing medical conditions (such as high blood pressure, heart disease, lung disease, cancer or diabetes) appear to develop serious illness more often than others.[17,53]

COMPLICATIONS OF COVID-19

Although most people with COVID-19 have mild to moderate symptoms, the disease can cause severe medical complications and lead to death in some people. Older adults or people with existing chronic medical conditions are at greater risk of becoming seriously ill with COVID-19. The most serious complication of a SARS-CoV-2 infection is a type of pneumonia that's

been called 2019 novel coronavirus-infected pneumonia (NCIP).

Complications can include:

- Pneumonia in both lungs
- Organ failure in several organs.[9]
- acute respiratory distress syndrome (ARDS)
- irregular heart rate (arrhythmia)
- cardiovascular shock
- severe muscle pain (myalgia)
- fatigue
- heart damage or heart attack.[10]

STATISTICS SHOWS THE GLOBAL PANDEMIC DISEASE TRANSMISSION

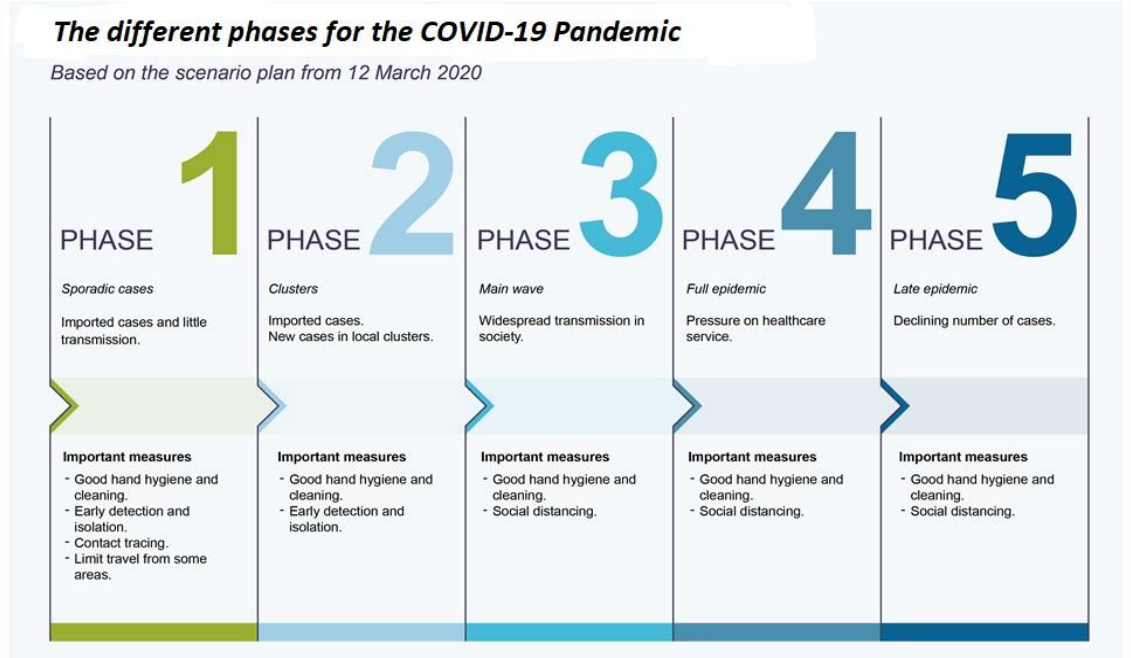

Figure 6: Showing the stages or phases for the pandemic COVID-19.[49]

Table 1: Confirmed and suspected cases of COVID-19 acute respiratory disease reported by province, data as of feb 2020.[13]

COUNTRIES AND TERRITORIES	TOTAL CASES	NEW CASES	TOTAL DEATHS	TOTAL RECOVERED
China	66,497	+2646	1523	8482
Japan	338	+79	1	12
Singapore	72	+5		18
Hong Kong	56		1	1
Thailand	34	+1		14
South Korea	28			9
Malaysia	21	+2		7
Taiwan	18			1
Germany	16			3
Vietnam	16			7
USA	15			3
Australia	15			10
France	11		1	4
Macao	10			3
U.K.	9			1
Canada	8			1
U.A.E.	8			3
Philippines	3		1	2
Italy	3			
India	3			3
Russia	2			2
Spain	2			2
Belgium	1			

Egypt	1			
Sweden	1			
Nepal	1			1
Sri Lanka	1			1
Finland	1			1
Cambodia	1			1

TABLE: 1.[29]

Table 2: Confirmed and suspected cases of COVID-19 acute respiratory disease reported by province, data as of march 2020.

COUNTRIES AND TERRORITIES	TOTAL CASES	NEW CASES	TOTAL DEATHS	TOTAL RECOVERED
USA	**123,781**	**+203**	**2,229**	**3,238**
Italy	**92,472**		**10,023**	**12,384**
Iran	**38,309**	**+2901**	**2,604**	**12,391**
India	**987**		**25**	**87**
Spain	**78,797**	**+5,562**	**6,528**	**14,709**
Germany	**58,247**	**+552**	**455**	**8,481**
France	**37,575**		**2,314**	**5,700**
UK	**17,089**		**1,019**	**135**
Switzerland	**14,352**		**282**	**1,595**
South Korea	**9,583**	**+105**	**152**	**5,033**
Austria	**8,486**	**+215**	**86**	**479**
Canada	**5,655**		**61**	**508**
Norway	**4,232**	**+217**	**25**	**7**
Australia	**3,969**	**+334**	**16**	**226**
Israel	**3,865**	**+246**	**14**	**89**
Sweden	**3,700**	**+253**	**110**	**16**
Malaysia	**2,470**	**+150**	**34**	**388**
Denmark	**2,395**	**+194**	**72**	**1**
Japan	**1,693**		**52**	**424**
Russia	**1,534**	**+270**	**8**	**64**
Pakistan	**1,526**	**+31**	**13**	**29**
Thailand	**1,388**	**+143**	**7**	**97**
Saudi Arabia	**1,299**	**+96**	**8**	**66**
Indonesia	**1,285**	**+130**	**114**	**64**
Singapore	**844**	**+42**	**3**	**212**
Mexico	**848**	**+131**	**16**	**4**
Hong Kong	**641**	**+81**	**4**	**519**
Sri Lanka	**115**	**+2**	**1**	**10**
Bangladesh	**48**		**5**	

TABLE: 2.[13]

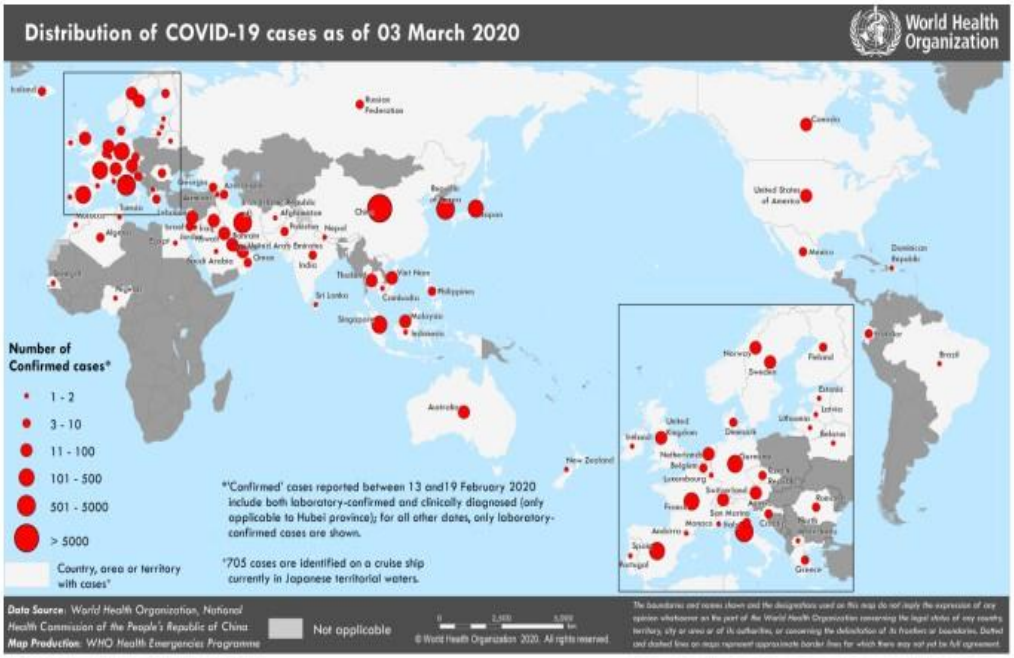

Figure 7: Countries, territories or areas with reported confirmed cases of COVID-19, 03 March 2020.[19]

The spread of novel coronavirus in India has created panic in the country. After the first confirmed positive case was reported on January 30 in Kerala, the pandemic has expanded its footprint in the country, affecting 1,367 people. More than three billion people around the world were living under lockdown for the past few days as governments stepped up their efforts against the coronavirus pandemic which has left more than 20,000 people dead worldwide.

While the impact of the novel coronavirus has been the most in China and Italy, India also is within its grasp. After making its presence in Kerala first, the novel coronavirus reached other cities/regions including Bengaluru, Pune, Delhi, Jaipur, Agra, Hyderabad, Jammu & Kashmir and others.[43]

The total number of positive cases (including deaths) in India: 1,559 as of March 31.
Total deaths in India: 49
No. of people discharged: 102

Table 3: Confirmed positive cases of COVID-19 acute respiratory disease reported by province in INDIA, data as of 31march 2020.

STATES/ UNION TERITORY	NO. OF POSITIVE CASES	FOREIGNERS	NO. OF DEATHS
KERALA	215	8	3
PUNJAB	41		4
DELHI	121	1	2
JAMMU & KASHMIR	55		2
LADAKH	13		
RAJASTHAN	93	2	
UTTAR PRADESH	103	1	
MAHARASHTA	302	3	
KARNATAKA	101		3
TAMIL NADU	124	6	1
TELANGANA	71	11	
HARYANA	39	14	
ANDHRA PRADESH	44		
HIMACHAL PRADESH	4		1
GUJARAT	73	1	5
UTTARAKHAND	7	1	
ODISHA	3		
WEST BENGAL	27		5
CHANDIGARH	13		

CHATTISGARH	**8**		
MADHYA PRADESH	**66**		**5**
BIHAR	**16**		**1**
PUDUCHERRY	**1**		
MANIPUR	**1**		
MIZORAM	**1**		
GOA	**6**		
ANDAMAN & NICOBAR ISLANDS	**10**		
ASSAM	**1**		

TABLE: 3.[43]

HOW TO PREVENT IT?

The CDC has published the following guidelines on its symptoms of novel corona virus 2019-nCoV:

- Use alcohol based hand sanitizer to prevent the virus which lives on the non living surfaces.
- You should maintain the 1 metre distance from the person droplets who is coughing.
- Regularly and thoroughly wash your hands with soap and water for at least 20 seconds.
- Clothes should be removed when came from the outside. Because may be infected person cough sneeze or any source of virus around you.
- Drink warm water to inhibit the virus, which lives for 4 days in your throat and do gargles early in the morning, As the cough leads to the respiratory problems
- Stay aware about the latest information on the covid-19 outbreak, available on WHO website and through your national and public health authority.
- Avoid touching your eyes nose and mouth. As you touch the surfaces having bacteria and viruses, makes you contaminated and transfer to the body easily which is enough to make sick you.
- Make sure the people around you maintain the good respiratory hygiene. Like covering mouth and nose while sneezing or coughing through the bent elbow or tissue which discarded or washed with disinfectant.
- Stay at home. Don't roam in outbreak. Make yourself quarantine and if not feeling well having similar symptoms to the covid-19 like fever cough and breathing difficulty, seek medical attention early. Don't hide any suspect of covid-19 to reduce the risk of developing corona virus in family members.[53,54,55,56]

WHAT NOT TO DO?

The following measures are not effective against covid-19 but they are harmful for you and others:-

- Smoking
- Wearing mask multiple times, which is for single use
- Taking antibiotics which don't kill viruses.
- Doesn't remove clothes when came from the outside.
- Doesn't take an advice from the doctor on a call when get infected.
- Doesn't tell your travel history.
- Travel in outbreak
- Immunocompromised people stay in the public places.[17,57]

HOW TO QUARANTINE THE INIDIVIDUAL?

There is several ways to stop spreading of viruses from one to another by quarantine self. Like isolation, masking, gloving, maintains hygiene, using disinfectant, by social distancing, staying at home, washing hands regularly, etc. They are described below in brief:-

- **Isolation**

If person in family get infected from the covid-19, the other members of the family gets secluded; such as housemates, children, elders, even pets of the house. If you don't have your own room, one should get the designated for exclusive use. Even use separated bathroom and all the things, if you have one.

No visitors and no staff, unless it's necessary. Don't take bus, subways, not even a taxi. Don't visit to crowded place or public places.[12]

- **Masking**

Wearing a mask in nearby places, to stop the spread of virus from the contagious one is a good practices. If you must be around other people- in shops or hospitals- you should wear a mask, and everyone else should, too.

- **Hygiene**

If you cough and sneeze, you should cover your mouth and nose with a tissue and discard the used tissue in lined trash can. Then you must immediately wash your hands with soap and water for at least 20 seconds.

Use your sanitizer, if you can find it, but soap and water is more preferable than sanitizer.

Even you are infected with the virus, you should wash your hands frequently and avoid touching your eyes, nose and mouth if you haven't just washed them.[58]

- **Disinfectant**

Doorknobs, countertops, tabletops, laptop screen, smart phone screen, keyboards, bathroom fixtures, toilets and beside al these high-touching surfaces" are considered. Wipe them often with a household cleanser or with the disinfectant.

Don't share your dishes, drinking glasses, cups, eating utensils, towels or bedding with anyone (including your pets). Wash these items after you use them.

Frequently wipe down surfaces that may be contaminated by bodily fluids, including blood and stool.

- **Household members**

Housemates doesn't go for work or school and colleges, but they can go for their job to stock up the groceries, pick up prescriptions, take care of the quarantined and keep the place clean. They will wipe down the doorknobs and table and countertops, doing loads of laundry and washing their hands – a lot.

When around the people whether patient or house members must wear a face mask, and both have mask and gloves. These should be thrown away immediately after the single use of it and never reused.

Elderly members of the household and those with chronic medical conditions are at particular risk if they are infected. Contact with the secluded individual should be minimised.

Other house members or occupants of the house should wash their hands frequently and avoid touching eyes, nose and mouth with unwashed hands. They should stay in separate rooms, if they have and use different things in routine.[18]

They should monitor their own health, too, and call a doctor if they develop a cough and other symptoms like shortness of breath.

DIAGNOSIS OF CORONAVIRUSES (COVID-19)

COVID-19 can be diagnosed similarly to other conditions caused by viral infections: using a blood, saliva or tissue sample. However, most test use a cotton swabs to retrieve a sample from the inside of your nostrils and through injection blood sample taken away.[11,15]

The symptoms of the early stages of the disease are non-specific. Differential diagnosis should include the possibility of a wide range of infectious and non-infectious common respiratory disorders like:

- Adenovirus
- Influenza
- Human meta-pneumonia-virus (HmPV)
- Para-influenza
- Respiratory syncytial virus (RSV)
- Rhinovirus (common cold)

For further cases, rapid antigen detection, and other investigations should be adopted for evaluating common respiratory pathogens and non-infectious conditions. The diagnostic algorithm adopted by the Laboratory for SARS-CoV-2 testing included, immediately upon sample receipt, a rapid molecular test for the most common respiratory pathogens in order to obtain a fast differential diagnosis. SARS-CoV-2 testing was based on the protocol released by the World Health Organization (WHO).[59]

Tests are conducted by the CDC, by some state health departments and some commercial companies. Talk to the physician right away if you think you have COVID-19 or you notice symptoms. Physician will advise you on whether you should stay home and monitor your symptoms by the physician or doctor's office to evaluate, or go to the hospital for more emergency.[7,10]

WILL ANTIBIOTICS EFFECTIVE TO PREVENT COVID-19?

There are not any antibiotics which is effective in covid-19. Antibiotics don't work against viruses; they only work on bacterial infections. COVID-19 is caused by a virus, so they treated by antiviral rather than antibiotics. Antibiotics should not be used for covid-19 as a means of prevention or treatment. You should ask direct to the physician for treatment and test.[12,19,55]

TREATMENTS OPTION AVAILABLE FOR COVID-19

There's currently no treatment or cure specifically for COVID-19, and although all the treatment and medicines are currently under study for the pandemic disease. Instead of the treatment, focus on managing symptoms as the virus replicate itself faster than any bacteria.

Other corona viruses like SARS and MERS are also treated by managing symptoms. In some cases, experimental treatments are tested to see how effective the drugs are. Such as therapies used in the illness including:

- Antiviral or retroviral medications
- Breathing support, such as ventilator, intubation oxygenation
- Steroids to reduce lung swelling
- Blood plasma transfusions

Among other therapeutics strategies, systemic corticosteroids for the treatment of viral pneumonia or acute respiratory distress syndrome (ARDS) are not recommended. Moreover, unselective or inappropriate administration of antibiotics should be avoided.

ICMR has supposed to give the corona virus patients the combination of the drugs which are essential to fight against the virus symptoms. In 2019 SARS-CoV-2 infection is treated by the antimalarial, antiretroviral and antiviral that is chloroquine(500mg every 12 hours), hydroxychloroquine (200mg every 12 hours); remdesivir; lopinavir/ritonavir (400mg every 12 hours). Although in preclinical studies suggested that remdesivir- an inhibitor of RNA polymerase with in-vitro activity against multiple RNA viruses. And no antiviral treatment has been approved yet.[10,19,20,53,58]

In Italy, a great investigation is focused on the use of tocilizumab. It is a humanised IgG monoclonal antibody, commonly used for the treatment of the rheumatoid arthritis.

HYDROXYCHLOROQUINE IN COVID-19

The Indian council for medical research (ICMR) released a statement on March 23 recommending use of the antimalarial drug hydroxychloroquine as a preventive medicine for those who face a high risk of corona virus infection.

Reported side effects of chloroquine include nausea, headache, mood swings, skin irritation, swelling, cramps, pale skin, and muscle weakness, bleeding from nose and hearing problems. An overdose can result in death. Hydroxychloroquine too can lead to headaches, nausea, lowering of blood glucose, drowsiness, reduced appetite, depression, irreversible blindness, cramps and heart failure(if overdosed).

ICMR recommended the drug for protection against covid-19 has widespread. Doctors says the medical evidence is still too limited to be sure of hydroxychloroquine's antiviral properties. Chloroquine exerts direct antiviral effects, inhibiting pH-dependent steps of the replication of several viruses, including members of the flavi-viruses, retro-viruses and corona viruses.

Both chloroquine and hydroxychloroquine were shown to inhibi11t SARS-CoV-2 in a lab setting. Further study concluded that hydroxychloroquine was more potent than chloroquine, with a more tolerable safety profile. It has been used to study several viral infections, including Ebola, influenza and dengue.[60]

It is very important to note that ICMR has specified only 2 categories of high risk in people who should use hydroxychloroquine for prevention or prophylaxis- health workers and household contacts of positive cases. But several studies noted that meaningful action requires a large dose of the drug inside the cells, and it can increases toxicity, which is a key concern when using both the drugs. The symptoms of COVID-19 were not as severe and patients were cured faster. But health organizations, including WHO, have not approved the use of either chloroquine or hydroxychloroquine for treatment or prevention. While both might be game-changers for the on-going pandemic, large scale studies need to be done before they can be certified as safe. Chloroquine was not used for almost decade as the initial evaluation considered it to be too toxic.[61]

CONCLUSION

The infection of COVID-19 is spreading all over the world and no one till date had discovered the medicine for treatment, still research is going on. Soon it is needed to be discovered as this infection is sweping up human population like no other disease or disaster in this 21st century. This COVID-19, once again proved that the 'PREVENTION IS BETTER THAN CURE', as cure is not available. Proper sanitization and social distancing break the chain of coronavirus infection. Some of other preventive measure to be followed during this is washing hands frequently and wearing mask. Still further research needs to be done as this is infecting health professional involved in treatment of infected person. Recently DRDO has developed a protective suit for health professional for their protection.

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