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RESEARCH ARTICLE

DEADLY OUTBREAK OF COVID-19: CORONA VIRUS, MIGRATION, GLOBAL PANDEMIC, SOME TREATMENTS AND PRECAUTIONS

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ABSTRACT

Corona viruses (CoVs) is an enveloped single-stranded RNA virus belonging to the family *Coronaviridae* that have various types of strain such as SARS-CoV, MERS-CoV, nCoV. After an outbreak of pandemic corona virus (COVID-19) from the Central Chinese city of Wuhan, WHO has been declared a global health emergency in whole world. Now it become a very serious problem even developed countries are worsely affected and because of this pandemic situation above 200 countries are affected and more than 204,987 people are died in the worldwide. Even in this modern era where we have enough resources but still we are facing many problems with lot of diseases. Scientists and doctors are not getting any medicines against this pandemic. Nobody knows how much time it will take to completely cure to all affected people. This has become a big gest threat to humanity in 2020.

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INTRODUCTION

At the end of the year of December 2019, a new pathogen is identified as novel corona virus (SARS-CoV-2) rise as a new outbreak of pneumonia (COVID-19) which is spread from Wuhan, China and now it is rapidly spreading to 31 provinces in China and over 199 countries all over the world (Drosten, 2003; Ksiazek, 2003). Corona viruses were given their name based on the crown-like protrusion spikes on the surfaces of their body and the projection of this crown can be seen by using electron microscope (Schoeman, 2019). The corona virus is belonging from enveloped virus family which replicate in the cytoplasm of animal host cells (Roizman). SARS-CoV-2 is known as the severe acute respiratory syndrome corona virus 2 which is 70% similar with SARS-CoV-1 because it is a beta corona virus and it shares the genetic sequence, having same vital structure with the acute respiratory syndrome corona (SARS-CoV-1). SARS-CoV-1, caused 349 deaths in 2002-2003 in China and Middle East (Dan Zhou, 2020). Due to COVID-19, the total number of corona affected confirmed cases are 2,995,758 had been reported which includes 204,987 deaths in all over world on dated April 29, 2020.

An increasing number of patient (COVID-19 cases) have also been reported daily in the United States, India, Spain, Germany, Iran, Japan, South Korea and Italy. Human corona virus (HCoV) is a species of corona virus that was firstly distinguish in 1960s in the nose of patient who suffers from common cold with respiratory illnesses. Two human corona viruses HCoV-229E and HCoV-OC43 are amenable for excerpt of common cold (Tyrrell, 1965; Hamre, 1966; Almeida, 1967; Thiel *et al.*, 2001; McIntosh *et al.*, 1967; Hendley, 1972; Mounir, 1994; Künkel, 1993; Bradburne, 1967). Corona viruses (CoVs) in ffections are firstly identified in birds and mammals and latter it is identified in human beings called HCoV (Kumar Ravi, 2020; Imtosh).

Types- These are mainly five genera

- Alpha Corona Virus (α -CoVs)
 - Feline FCoV,
 - FECV (Feline Enteric Coronavirus)
 - FIPV (Feline Infectious Peritonitis Virus),
 - Porcine TGEV (Transmissible Gastro- Enteritis Virus),
 - Porcine PEDV (Epidemic Diarrhea Virus),
 - PRCoV (Porcine Respiratory Coronavirus) and
 - Canine CCoV.

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- Beta Corona Virus (β -CoVs)
 - SARS-CoV,
 - HCoV-OC43,
 - HCoV-HKU1,
 - MERS-CoV,
 - Murine coronavirus (MHV) and
 - Bovine Coronavirus (BCoV).
- Gama Corona Virus (γ -CoVs)
- Delta Corona Virus (δ -CoVs)
 - HKU11,
 - HKU12,
 - HKU13
- Novel corona virus (n-CoV or COVID-19) (Pradesh, 2014; Tok; Health Protection Agency, 2013)

Novel corona virus (n-CoV): Novel coronavirus (nCoV) is a new strain that has not been previously identified in humans. This “novel” coronavirus is now officially named as Coronavirus Disease 2019 (COVID-19). COVID-19 belongs to the same big family.

MERS – CoV: MERS-CoV stands for Middle East Respiratory Syndrome Corona virus (MERS-CoV). It is also known as camel flu, because it transfers from dromedary camels to humans. It was firstly reported in Saudi Arabia in 2012 and has since spread to numerous countries (<https://www.cdc.gov/coronavirus/mers/index.html>). Its death rate near about 1/3 of the patients who suffers from MERS-CoV that is to say 36% people were died of the diagnosed patient.

SARS – CoV: Severe acute respiratory syndrome corona virus or SARS-CoV is a species of corona virus belongs to family *coronaviridae* which cause respiratory illness in the human beings. It was transmitted from civet cats to humans. It is mostly spread with the intimate contact from person-to-person such as hand shaking, to hug, conjoin, clasp hands etc. This pandemic was firstly originated from Wuhan, China in November 2020. Its spread through 29 countries in the world wide in which 8000 people were infected with 774 deaths (https://www.medicinenet.com/severe_acute_respiratory_syndrome_sars/article.htm#severe_acute_respiratory_syndrome_sars_facts). A mechanism of SARS associated abnormal hematopoiesis describes in figure-1.



Figure 1: A hypothesis of the mechanism of SARS associated abnormal hematopoiesis

Structure of corona virus: Like other corona virus, particle size of the SARS-CoV-2 is spherical and also having mushroom shaped proteins called spikes protruding from their surface which giving the particles a crown like appearance. The spike (S) binds and fuses to human cells, allowing the virus to gain entry.

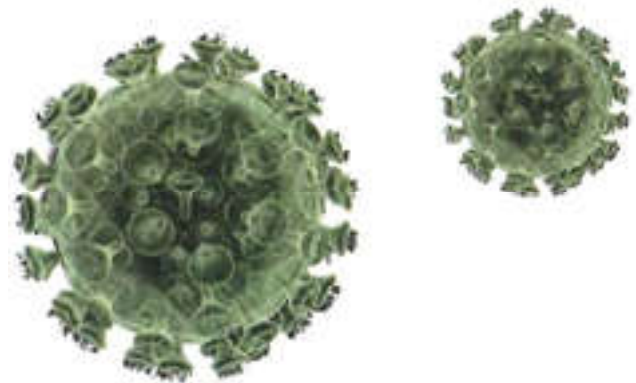


Figure 2. 3D view of corona virus virion

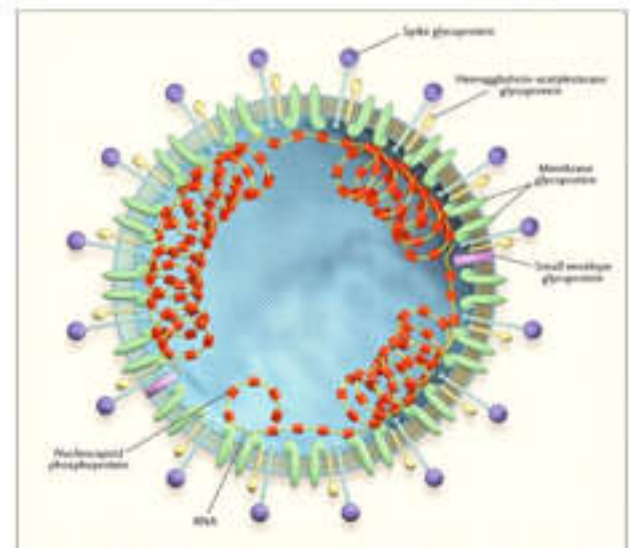


Figure 3. Structure of the Corona virus Virion

It consists of four major proteins

Major proteins

- S – Spike
- E – Envelope
- M – Membrane
- N – Nucleocapsid (<https://www.cdc.gov/coronavirus/2019-ncov/faq.html>)

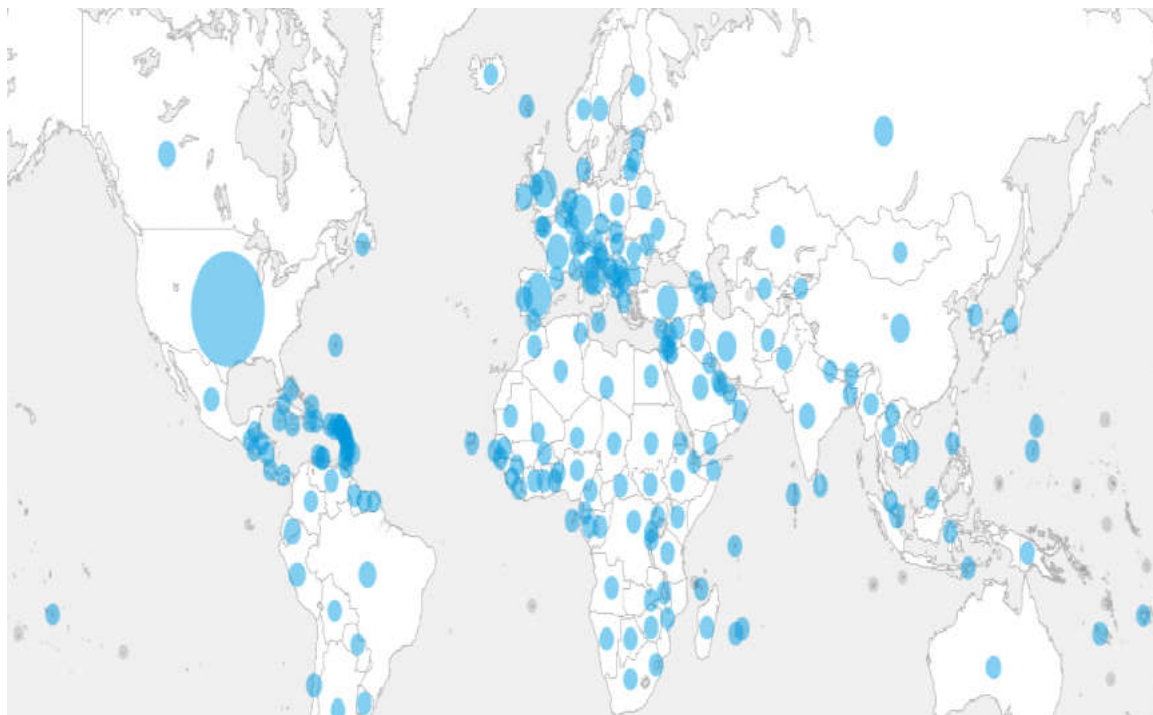
UNDERSTANDING THE DISEASE

WHO (World Health Organization) has been confirmed that COVID-19 to be a pandemic. It has been identified that the symptoms of COVID-19 appear in 2-14 days after exposure and it includes cough, raise in body temperature, a runny nose and problem shown in respiratory system.

How dangerous it is?: Scientists and doctors are racing to understand the pandemic of corona virus disease namely COVID-19.

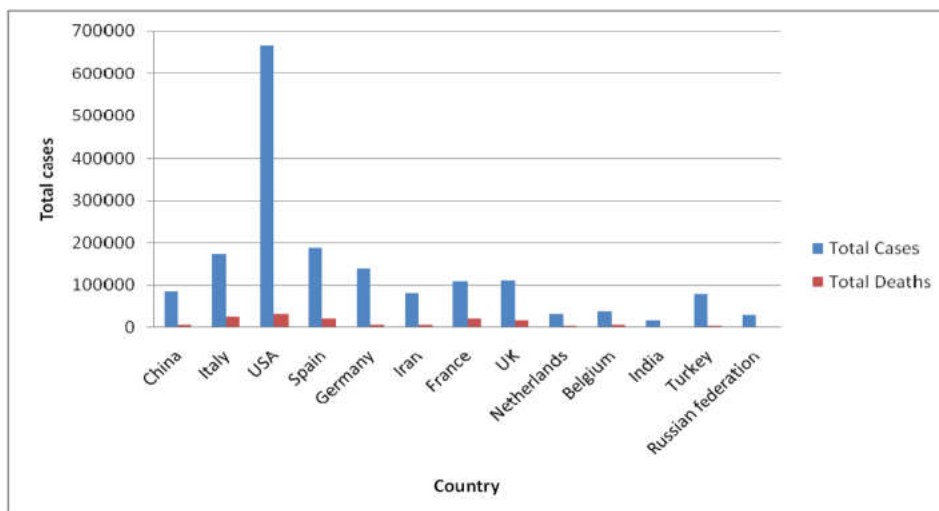
Table 1. Compiled arrangements of symptoms, clinical manifestations, incubation periods, way of transmission and their preventive measures according to Ministry of Health and Family Welfare (MoHFW), Ministry of Shipping (MoS), International Maritime Organization (IMO), World Health Organization (WHO)

	COVID-19	SARS	INFLUENZA	COMMON COUGH
Clinical Manifestations	Excessive fatigue, cough, shortness of breath, coughing up yellow or green mucous, chest x-ray shows scattered opacities in the lungs	Coughs, breathing difficulties, fatigue, headache and diarrhea: fever	Running nose, sneezing, cough, high temperature, muscle pain, diarrhea, vomiting	Nasal congestion, sore throat, cough, throat discomfort, sneezing
Incubation period	7-14 days	2-7 days	1-4 days	1 day
Way of transmission	Short distance droplets spread, close contact, contact with animals	Short distance droplets spread, close contact,	Cough, sneezing and close contact with secretion of an infected person	Droplets spread, contact with infected nasal secretions
Preventive measures	Regular and frequent hand washing, check body temperature, use alcohol based disinfectant, wear a surgical mask, enhance air flow, avoid contact with animals or eat game meat	Cover mouth and nose when sneezing, Regular and frequent hand washing, do not touch mouth and nose, wear a surgical mask, enhance air flow	Vaccination (flu-shot), keep hand clean, wear a surgical mask, enhance air flow	Regular hand wash, wear a surgical mask, boost your immune system



(Source: WHO, 2020, Accessed date: 29 April 2020, 11:00 AM).

Figure 4. Current distribution of COVID-19 in different countries



(Source: WHO, 2020, Accessed date: 18 April 2020).

Figure 5. The comparative study of COVID-19 cases of India with other Country

Table 2. List of drugs belongs to various category

SR. NO.	CATEGORY	DRUGS
1.	Antiviral agents	Baloxavir, Remdesivir, Osetamivir
2.	Antimalarial	Chloroquine Phosphate, Hydroxychloroquine (Plaque nil)
3.	Anti HIV drug	Lopinavir and Ritonavir
4.	Antibiotic Macrolides	Azithromycin
5.	Anti-Rheumatic drug	Sarilumab, Tocilizumab
6.	Anti-Parasitic drug	Ivermectin

Table 3. List of supporting agents

SR.NO.	SUPPORTING AGENT	DRUGS
1.	Vitamin	Vitamin C (Ascorbic acid)
2.	Steroids	Methylprednisolone
3.	Vasodilating agent	Nitric oxide (inhaled)
4.	Immunosuppressive agent (mTOR inhibitor)	Sirolimus
5.	Non-steroidal Anti-inflammatory Agents (NSAIDS)	Indomethacin
6.	Chemical salt	Ammonium Chloride

Table 4: List of herbal drugs effective against COVID-19

SR. NO.	NAME OF HERBAL DRUGS
1.	Oreganoil (Origanum vulgare)
2.	Basil (Tulsi)
3.	Fennel
4.	Garlic
5.	Peppermint
6.	Echinacea
7.	Sambucus
8.	Ginger
9.	Ginseng
10.	Astragalus
11.	Black pepper
12.	Clove
13.	Ephedra
14.	Dandelion
15.	Dioscorea

This virus causes the respiratory illness in the human beings. It causes mild symptoms including cough and fever. It can be more severe for those persons who are suffering from pneumonia or breathing difficulties.

How does the virus spread?: The new corona virus causes respiratory illness which spreads

- When an infected person coughs
- Through droplets of saliva
- Stemutation
- Between people who are in close contact with another within 6 feet (<https://www.sciencedirect.com/topics/neuroscience/coronavirus>)

Symptoms for corona virus family

Cold – or – flu like symptoms vary from person-to-person with COVID-19 patients (<https://www.cdc.gov/coronavirus/2019-ncov/about/transmission.html>). These are some of the symptoms that may occurs in the infected persons. Compiled details are shown in table-1.

It includes:

- Stemutation
- Pharyngitis
- Tiredness
- Cold
- Headache (van der Hoek, 2014)

COVID-19 PANDEMIC: After the identification of COVID-19, it has been declared that the virus was initiated from the human seafood market, situated in Wuhan city of China in December 2019. And within 2 months, COVID-19 is spread in whole world resulting it has turned out to be a global health emergency (Wang, 2020). WHO confirmed that there are more than 200 countries/regions have been identified for COVID-19 cases, which includes China, USA, Italy, Iran, South Korea, India, Taiwan, Sweden, UK, Nepal, Japan, Spain, Singapore, Finland, Belgium, Thailand, Russia, Cambodia, Philippines, Sri Lanka, Germany, Switzerland, United Arab Emirates (Figure-4). If the concern about the number of COVID-19 infected patients, it is found that USA is at the top of the list because of more than 30,000 people died followed by the Spain (Figure-5). The first COVID-19 case outbreak in India was reported on 30 January 2020, the patient is belonging from Kerala's Thrissur district when a student had returned home from Wuhan University in China (Rawat Mukesh).

TREATMENTS MODALITIES: There is no current evidence from randomized controlled trial to recommend any specific treatment for suspected or confirmed COVID-19 patients. Also there is no specific or particular anti-viral medicines are recommended for treatment of those suffering from respiratory ailment due to lack of adequate evidence from medical literature (<https://www.indiatoday.in/india/story/coronavirus-in-india-trackingcountry>). In India, the Union Health Ministry has been circulating guidelines in which they recommend the use of anti-HIV drug combinations Lopinavir

and Ritonavir on a case-to-case basis depending upon the severity of the condition of a person having corona virus infection. The Union Health Ministry of India recommended Lopinavir-Ritonavir for high-risk groups where patients aged above 60 or more than 60, suffering from diabetes mellitus, renal failure, chronic lung disease and are immunocompromised. However, the use of Lopinavir-Ritonavir in PEP regimens for HIV is also associated with significant adverse events which many times leads to discontinuation of therapy. Some of collective medicines that can be used to prevent or cure the corona symptoms shown in table-2, table-3 and table-4.

World-wide used medicine for the treatment of COVID-19

- It has been reported that there are various drugs which belong to the category of Antiviral, Anti-HIV, Antimalarial etc. are available for the treatment of COVID-19. Some of drugs are enlisted in table-2.
- Supporting agents also can be used in the treatment of COVID-19
- Herbal drugs can be used in the Pre and post infection with allopathic treatment of covid-19

Protecting yourself against COVID-19: Although there is no specific vaccine available to prevent this pandemic COVID-19 infection therefore self-isolation is the step to reduce the risk of infection. WHO (World Health Organisation), CDC (Centres for Disease Control), Health Ministry of India recommend following these precautions for avoiding COVID-19 (29).

Standard Precautions

- Avoid gathering and large events.
- Restriction of physical contact with anyone (within about 2 meters) who having sick or same symptoms.
- Keep distancing yourself with Covid-19 patient
- Cover the nose and mouth during coughing or sneezing with tissue or flexed elbow.
- Correct and consistent use of appropriate hand hygiene or soap with water at least for 20 seconds.
- Perform hand hygiene before and after all patient contact, and after contact with respiratory secretions.
- Ensure that environmental cleaning and disinfectants are used for all instruments/apparatus that are used in patients caring.
- Manage laundry, food service and medical waste in accordance with safe routine procedures (29, Sarparast, 2015; Nulens, 2018).

CONCLUSION

According to the government (Health Ministry of India) and WHO report, approximately 204,987 people died in whole world who are suffering from the corona virus. Around 200 countries are affected by corona virus. At this stage Indian government compelled to take a decision for lockdown in whole country at dated 24 March 2020, resulting in fall down of economic condition due to COVID-19 and people of every country get panic. At this time, it becomes a very serious problem for the population of the country because there is no particular therapeutic treatment or neither vaccine for COVID-19. Scientists and doctors are not getting any medicine against this pandemic, they are trying to tackle this pandemic nemesis. Nobody knows how much time it will take to develop the vaccine for COVID-19. So, stay home and stay safe and taking

every day preventative actions help to stop the spread of corona virus.

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