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"CORONA VIRUS" INTRODUCTION OF NOVAL CORONA VIRUS

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ABSTRACT

Objective: The objective of the study is to Corona viruses are a group of related RNA viruses that cause diseases in mammals and birds. In humans, these viruses cause respiratory tract infections that can range from mild to lethal. Mild illnesses include some cases of the common cold (which is also caused by other viruses, predominantly rhinovirus), while more lethal varieties can cause SARS, MERS, and COVID-19. Symptoms in other species vary: in chickens, they cause an upper respiratory tract disease, while in cows and pigs they cause diarrhea. There are as yet no vaccines or antiviral drugs to prevent or treat human corona virus infections. Corona viruses constitute the subfamily Orthocoronavirinae, in the family Coronaviridae, order Nidovirales, and realm Riboviria.[2][3] They are enveloped viruses with a positive-sense single-stranded RNA genome and a nucleocapsid of helical symmetry.[4] The genome size of corona viruses ranges from approximately 26 to 32 kilobases, one of the largest among RNA viruses.[5] They have characteristic club-shaped spikes that project from their surface, which in electron micrographs create an image reminiscent of the solar corona, from which their name derives.[6]

KEYWORDS: Corona, RnaVirus, Symptoms, Family.

INTRIDUCTION

Corona virus, any virus belonging to the family Coronaviridae. Corona viruses have enveloped virions (virus particles) that measure approximately 120 nm (1 nm = 10^{-9} metre) in diameter. Club-shaped glycoprotein spikes in the envelope give the viruses a crown like, or coronal, appearance. The nucleocapsid, made up of a protein shell known as a capsid and

containing the viral nucleic acids, is helical or tubular. The corona virus genome consists of a single strand of positive-sense RNA (ribonucleic acid).[1]

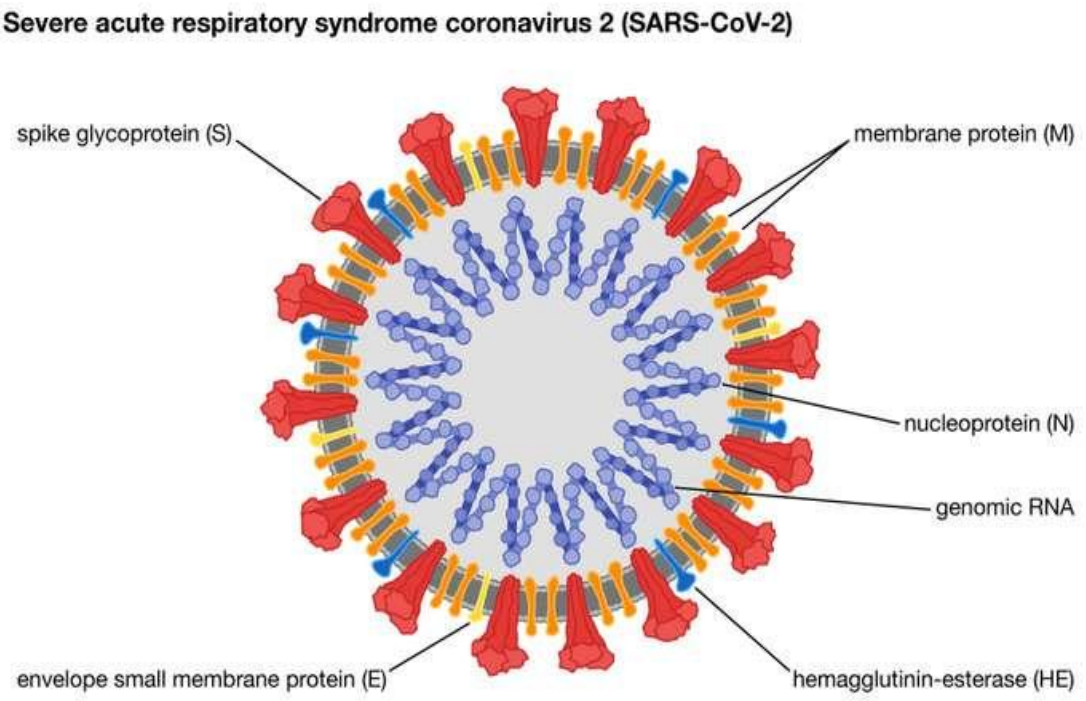

Figure 1:- SARS-CoV-2.

Coronaviridae is generally considered to contain two genera, Corona virus and Toro virus, which differ in nucleocapsid morphology, the former being helical and the latter being tubular.

Corona viruses are important agents of gastrointestinal disease in humans, poultry, and bovines.

In humans, a species known as SARS corona virus (or severe acute respiratory syndrome corona virus) causes a highly contagious respiratory disease that is characterized by symptoms of fever, cough, and muscle ache, often with progressive difficulty in breathing.

The virus emerged in humans in 2002; it likely jumped to humans from an animal reservoir, believed to be horseshoe bats.

The ability of SARS corona virus to jump to humans undoubtedly required genetic changes in the virus. These changes are suspected to have occurred in the palm civet, since the SARS virus present in horseshoe bats is unable to infect humans directly (see SARS).

In 2012 another corona virus capable of causing a severe acute respiratory illness later known as Middle East respiratory syndrome (MERS) was discovered in humans.

The first case was found in Saudi Arabia, and others were reported within the following year in France, Germany, Jordan, Qatar, Tunisia, the United Arab Emirates, and the United Kingdom. All confirmed cases were directly or indirectly linked to the Middle East. Of all confirmed cases documented by 2019, roughly one-third had ended in death.

The novel MERS corona virus was similar to other corona viruses known to have originated in bats and was thought to be passed from bats to other animals before being transmitted to humans. Camels were identified as one possible reservoir for the MERS virus.

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COVID-19

In 2019, the Centers for Disease Control and Prevention (CDC) started monitoring the outbreak of a new corona virus, SARS-CoV-2, which causes COVID-19. Authorities first identified the virus in Wuhan, China.

Since then, the virus has spread to nearly every country, leading the World Health Organization (WHO) to declare a pandemic.[2]

The new corona virus has been responsible for millions of infections globally, causing hundreds of thousands of deaths. The United States has seen the highest number of these deaths.

The first people with COVID-19 had links to an animal and seafood market. This suggests that animals initially transmitted the virus to humans. Then, people with no connections to the market developed the disease, confirming that humans can pass the virus to each other.

Most people who get COVID-19 will have a mild form of the disease. According to the WHO, around 80% of people who get COVID-19 will recover without needing hospitalization.

The remaining 20% become seriously ill and develop difficulty breathing.

Some groups are more at risk of severe disease, including older adults and people with underlying medical concerns, including high blood pressure, heart and lung problems, diabetes, and cancer.

The mortality rate varies between countries. In the U.S., the death rate is around 6%.

According to the CDC, children are not at higher risk of COVID-19 than adults.

Pregnant women appear to have the same risk of COVID-19 as other adults. However, during pregnancy, women have a higher risk of severe illness from viruses that are similar to SARS-CoV-2 and influenza.

The CDC also recommends that infants born to women with suspected or confirmed COVID-19 are put into isolation.[1]

SYMPTOMS OF COVID-19

According to the CDC, people may start to experience symptoms 2–14 days after exposure to the virus. Symptoms may include[1]:

i) A fever
ii) Chills
iii) A cough
iv) Shortness of breath or difficulty breathing
v) Sore throat
vi) Congestion or a runny nose
vii) Fatigue
viii) Headache

ix) Muscle pain
x) New loss of taste or smell
xi) Nausea or vomiting
xii) Diarrhea

According to the CDC, the following groups have a higher risk of developing serious illness from COVID-19:

i) People aged 65 years or older.
ii) People living in nursing homes or care facilities.
iii) People of any age who have serious underlying medical conditions, including chronic lung disease, serious heart conditions, severe obesity, a compromised immune system, or diabetes.
iv) The CDC note that although there have been reports of complications in young children, these are rare.
v) COVID-19 most commonly produces mild symptoms in children.

Types

Corona viruses belong to the subfamily Coronavirinae in the family Coronaviridae.

Different types of corona virus vary, in terms of the severity of disease that they cause and how far they spread.

Doctors currently recognize seven types of corona virus that can infect humans.

Common types include:

1. 229E (alpha corona virus)
2. NL63 (alpha corona virus)
3. OC43 (beta corona virus)
4. HKU1 (beta corona virus)

Rarer strains that cause more severe illnesses include MERS-CoV, which causes the disease MERS, and SARS-CoV, the virus responsible for SARS.

In 2019, a new strain, called SARS-CoV-2, started circulating, causing the disease COVID-19.[1]

TRANSMISSION

The CDC recommends that all people wear cloth face masks in public places where it is difficult to maintain a 6-foot (2-meter) distance from others.

This will help slow the spread of the virus from asymptomatic people and people who do not know that they have contracted it.

People should wear cloth face masks while continuing to practice physical distancing. Instructions for making masks at home are available here.[1]

Note: It is critical that surgical masks and **N95** respirators are reserved for healthcare workers.

Researchers believe that the viruses transmit via fluids in the respiratory system, such as mucus.

For example, a corona virus can spread when a person:
Coughs or sneezes without covering their mouth, dispersing droplets into the air.
Touches someone who has the infection.
Touches a surface that has the virus, and then touches their own nose, eyes, or mouth.

Figure 2: Prevention.

Some animal corona viruses may spread to humans through contact with faces, though it is unclear whether human corona viruses can spread in the same way.

Corona viruses will infect most people at some point.

To prevent transmission, people with symptoms should stay at home, rest, and avoid coming into close contact with other people.

Covering the mouth and nose with a tissue or handkerchief while coughing or sneezing can also help prevent transmission. It is important to dispose of used tissues right away and maintain proper hygiene around the home.[1]

SARS

SARS is a contagious disease that develops from infection with the SARS-CoV corona virus. In many cases, it leads to a life threatening form of pneumonia.

In November 2002, the virus started circulating in the Guangdong province of southern China, eventually reaching Hong Kong. From there, it rapidly spread, causing infections in more than 24 countries.

Experts no longer consider SARS a risk. Since 2003, there have only been a few cases due to laboratory accidents or, possibly, transmission from animals.

SARS-CoV affects both the upper and lower respiratory tract.

The symptoms of SARS develop over 1 week and start with a fever. Early on, people develop flu-like symptoms, such as:

i) A dry cough
ii) Chills
iii) Diarrhea
iv) Breathlessness
v) Aches

Pneumonia, a severe lung infection, usually develops. At its most advanced stage, SARS causes failure of the lungs, heart, or liver.

According to the CDC, authorities reported that 8,098 people contracted SARS during the outbreak. Among these people, 774 died of the disease. This indicates a mortality rate of 9.6%.

Complications are more common among older adults. According to one source, more than half of those who died from the infection were over the age of 65. Authorities eventually controlled SARS in July 2003.[1]

MERS

MERS is caused by the MERS-CoV corona virus. Scientists first recognized this severe respiratory illness in 2012 after it surfaced in Saudi Arabia. Since then, it has spread to other countries.

The virus has reached the U.S. However, only two people in the country have tested positive for MERS-CoV, and this was in 2014. As a result, the CDC states that the risk of developing MERS in the U.S. is very low. Symptoms of MERS include a fever, breathlessness, and coughing. The illness spreads through close contact with people who have the infection.

A 2019 investigation into MERS found that the disease is fatal in 35.2% of people who develop it.

HOW CAN IT BE DETECTED?

The virus can be detected using a RT-PCR test. An RT-PCR or reverse transcription polymerase chain reaction test is DNA-based and can quickly tell if someone harbours the virus.

In India, the government facilities to test for the virus include 52 labs belonging to the Viral Research and Diagnostic Laboratories network of the Indian Council of Medical Research (ICMR), 10 labs under the National Centre for Disease Control (NCDC), and the NIV.[1]

WHAT IS THE TREATMENT?

There is no current evidence from randomised controlled trial to recommend any specific treatment for suspected or confirmed COVID19 patients.

No specific anti-virals are recommended for treatment of those suffering from respiratory ailment due to lack of adequate evidence from medical literature.

In India, the Union Health Ministry guidelines has recommended use of anti-HIV drug combinations Lopinavir and Ritonavir on a case-tocase basis depending upon the severity of the condition of a person having corona virus infection.

The Ministry recommended Lopinavir-Ritonavir for high-risk groups: patients aged above 60, suffering from diabetes mellitus, renal failure, and chronic lung disease and are immuno-compromised. However, the use of Lopinavir-Ritonavir in PEP regimens for HIV is also associated with significant adverse events which many times lead to discontinuation of therapy.

The guidelines advise the treating doctors to closely monitor patients with severe acute respiratory infection for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions immediately. "Application of timely, effective, and safe supportive therapies is the cornerstone of therapy for patients that develop severe manifestations of COVID-19," it said.[1]

CAN A VACCINE BE DEVELOPED FOR COVID-19?

According to Raman. R. Gangakhedkar, head of the Epidemiology and Communicable Diseases-I (ECD-I), Division of ICMR, there are two ways of going for vaccine preparation — either you look at the sequences of the gene which then may lead to development of antibodies, or you actually have the strain and then you try to develop a vaccine which is always an easier option.

He said Indian scientists have managed to successfully isolate the COVID-19 virus and about 11 isolates are available which is a prime requisite for doing any kind of research related to viruses and developing the vaccine. Internationally, several institutes and pharmaceutical companies are in various stages of developing the vaccine with some set to go on clinical trials soon.[1]

PROTECTING YOURSELF AGAINST COVID-19

Guidelines by the World Health Organization specify that one of the ways to reduce the risk of infection is by regularly and thoroughly cleaning one's hands with an alcohol-based hand rub or washing them with soap and water.

Regular washing becomes important as the virus tends to be viable from hours to more than a day on different surfaces that are regularly touched with hands.[1]

WASHING WITH SOAP

The grime on our hands contains innumerable viruses and bacteria.

Washing with water without using soap helps reduce the amount of microbes but does not remove most of the virus and bacteria completely. Using soap, therefore, becomes far more effective in removing microbes.

Figure 3:- Washing Hand.

Viruses such as corona virus, influenza-causing viruses, Ebola, Zika have their genetic material encased in a layer of fat called the lipid envelope.[8]

Soap molecules are pin-shaped with a head that is water loving (hydrophilic) and a tail that is oil-loving (oleophilic). Being oleophilic, the tail portion of the molecule tends to have an affinity for and 'competes' with the lipids in the virus envelope.

Since the chemical bonds holding the virus together are not very strong, the long oleophilic tail gets inserted into the envelope and tends to have a 'crowbar' effect that breaks the lipid envelope of the virus.

The tail also competes with the bond that binds the RNA and the lipid envelop thus dissolving the virus into its components which are then removed by water.[1]

ALCOHOL-BASED HAND SANITIZERS

Like soap, the alcohol present in hand sanitizers dissolve the lipid envelope, thus inactivating the virus. In addition, the alcohol also tends to change the shape or denature the mushroom-shaped protein structures that stick out of the lipid envelope.

The mushroom-shaped protein structures help the virus to bind to special structures found on human cells and enter the cells. To be effective, the sanitizers should contain at least 60% alcohol. Unlike soap lather, the alcohol does not come in contact with all parts of the hand.

So care needs to be taken to use sufficient sanitizer to increase the coverage. Unlike water, alcohol run does not remove the dead viruses from the hand. While a sanitizer can quickly reduce the number of microbes, it does not get rid of all types of germs, and is "not as effective when hands are visibly dirty or greasy".

Figure 4:- Alcohol-Based Hand Sanitizers.

USING A MASK

Medical masks help prevent the spread of corona virus infection. If worn properly, masks may be effective in preventing transmission of corona virus. An article published in the Journal of the American Medical Association (JAMA) says there is no evidence to suggest that masks worn by healthy individuals can help prevent infection.

But a 2010 study says: "Mask wearing was associated with reduced secondary transmission and should be encouraged during outbreak situations." Even the World Health Organization says wearing a medical mask is "one of the prevention measures to limit spread of certain respiratory diseases, including novel corona virus (SARS-CoV-2), in affected areas". Transmission through droplets from coughing and sneezing is one of the major routes of virus spread. When worn correctly, a mask can reduce the risk of inhaling droplets containing the virus.

With many studies showing that people infected with novel corona virus transmit the virus even before symptoms show up, it may be prudent to wear a mask especially when the virus is spreading in the community.

In a country like India, maintaining at least one metre distance can be a challenge, especially when there is no way of knowing who is infected till such time the person starts showing visible symptoms.

Figure 5: N95 Mask.

SOCIAL DISTANCING

The WHO says that you should maintain at least 1 metre (3 feet) distance between yourself and anyone who is coughing or sneezing. This is because when someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. "If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person coughing has the disease," says the WHO.

Figure 6:- Social Distancing.

AVOID TOUCHING EYES, NOSE AND MOUTH

Hands can pick up viruses as they come in contact with many surfaces.

It can then transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can make you sick.

Figure 7:- Avoid Touching Eyes, Nose and Mouth.

PRACTISE RESPIRATORY HYGIENE

Cover your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately.

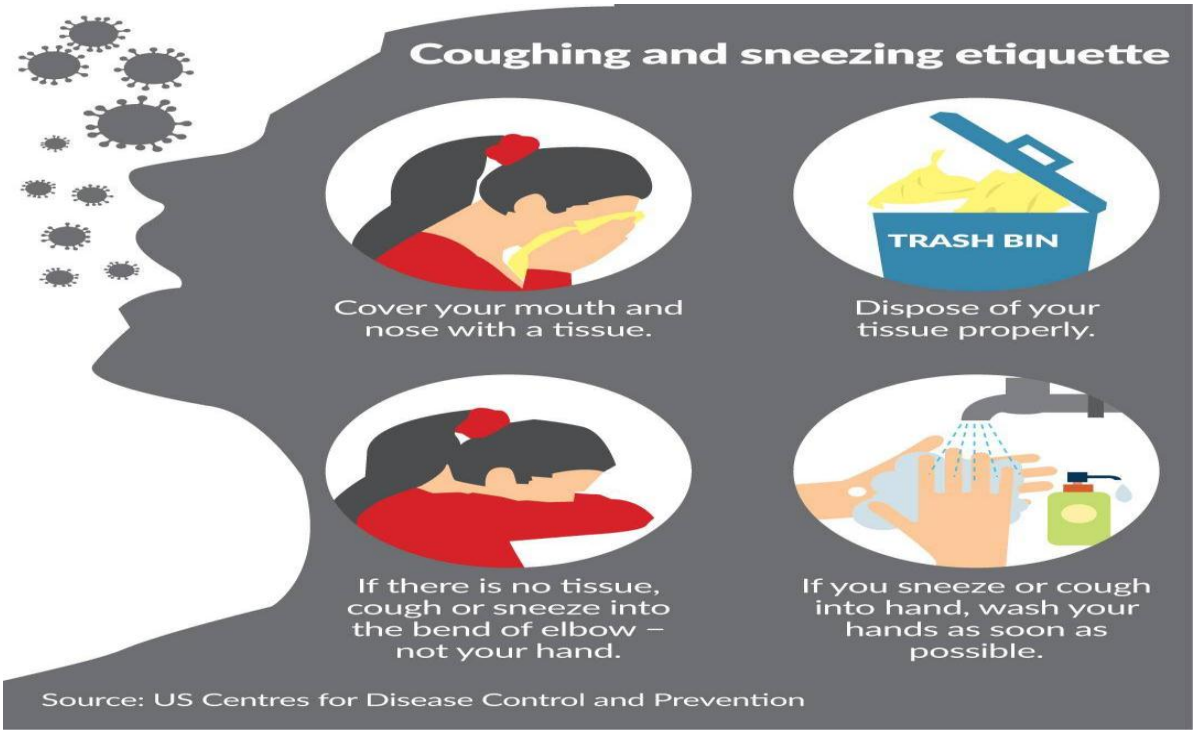

Figure 8:- Practise Respiratory Hygiene.

CONCLUSION

There are hundreds of corona viruses, most of which circulate in animals. Only seven of these viruses infect humans and four of them cause symptoms of the common cold. But, three times in the last 20 years, a corona virus has jumped from animals to humans to cause severe disease.

SARS, a beta corona virus emerged in 2002 and was controlled mainly by aggressive public health measures. There have been no new cases since 2004. MERS emerged in 2012, still exists in camels, and can infect people who have close contact with them.

COVID-19, a new and sometimes deadly respiratory illness that is believed to have originated in a live animal market in China, has spread rapidly throughout that country and the world.

The new corona virus was first detected in Wuhan, China in December 2019. Tens of thousands of people were infected in China, with the virus spreading easily from person-to-person in many parts of that country.

The novel corona virus infections were at first associated with travel from Wuhan, but the virus has now established itself in 177 countries and territories around the world in a rapidly expanding pandemic. Health officials in the United States and around the world are working to contain the spread of the virus through public health measures such as social distancing, contact tracing, testing, quarantines and travel restrictions. Scientists are working to find medications to treat the disease and to develop a vaccine.

The World Health Organization declared the novel corona virus outbreak “a public health emergency of international concern” on January 30. On March 11, 2020 after sustained spread of the disease outside of China, the World Health Organization declared the COVID-19 epidemic a pandemic. Public health measures like ones implemented in China and now around the world will hopefully blunt the spread of the virus while treatments and a vaccine are developed to stop it.

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6. Jump up to:[a b c d] Almeida JD, Berry DM, Cunningham CH, Hamre D, Hofstad MS, Mallucci L, McIntosh K, Tyrrell DA (November 1968). "Virology: Coronaviruses". Nature, 220(5168): 650. Bibcode:1968Natur.220..650.. doi:10.1038/220650b0. [T] here is also a characteristic "fringe" of projections 200 A long, which are rounded or petal shaped ... This appearance, recalling the solar corona, is shared by mouse hepatitis virus and several viruses recently recovered from man, namely strain B814, 229E and several others.