



**REVIEW ON BASIC FACTS & INFORMATION OF CORONAVIRUS**

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**ABSTRACT**

Coronaviruses are enveloped non-segmented positive-sense RNA viruses belonging to the family Coronaviridae and the order Nidovirales which is broadly distributed in humans and other mammals. Although most human coronavirus infections are mild, but the epidemics of the two beta coronaviruses, Severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV), have caused more than 10,000 cumulative cases in the past two decades. And now a novel coronavirus namely called as 2019-nCoV is a new strain which has not been previously identified in humans emerged as major global health threats. Thus this study aims to assess the awareness of this novel coronavirus among general public and to provide some basic facts & information on this novel coronavirus. This study basically involves the general guidelines for public that how one should react in concern of coronavirus. Also it includes the recommendations from WHO for general public that how to protect oneself from this life threatening virus. Our recommendation is to conduct a continuous health education campaign about the awareness of coronavirus and also to provide the general guidelines & some basic information about symptoms, spreading pattern, mutation, infection, care and treatment of coronavirus among general public.

**KEYWORDS:** Coronavirus, Novel Coronavirus, MERS-CoV, SARS-CoV, 2019-nCoV

**BACKGROUND**

Coronaviruses are enveloped non-segmented positive-sense RNA viruses belonging to the family Coronaviridae and the order Nidovirales which is broadly distributed in humans and other mammals. Although most human coronavirus infections are mild, the epidemics of the two beta coronaviruses, severe acute respiratory syndrome coronavirus (SARS-CoV)<sup>[1-3]</sup> and Middle East respiratory syndrome coronavirus (MERS-CoV)<sup>[4, 5]</sup> have caused more than 10,000 cumulative cases in the past two decades, with mortality rates of 10% for SARS-CoV and 37% for MERS-CoV.<sup>[6,7]</sup>

These two more novel coronaviruses (CoVs) have emerged as major global health threats since 2002, namely severe acute respiratory syndrome coronavirus (SARS-CoV; in 2002) that spread to 37 countries, and Middle East respiratory syndrome coronavirus (MERS-CoV; in 2012) that spread to 27 countries. SARS-CoV caused more than 8000 infections and 800 deaths, and MERS-CoV infected 2494 individuals and caused 858 deaths worldwide to date. Both are zoonotic viruses and having epidemiologically similar, except that SARS-CoV has virtually no subclinical manifestation, whereas MERS-CoV behaves more similarly to the other four commonly circulating human CoVs, with a substantial proportion of asymptomatic infections. Symptomatic

cases of both viruses usually present with moderate-to-severe respiratory symptoms that often progress to severe pneumonia. A notable common characteristic of both SARS-CoV and MERS-CoV is that they have low potential for sustained community transmission (ie, low basic reproductive number).<sup>[8,9,10]</sup> However, the most worrisome aspect is the ability of the viruses to cause unusually large case clusters via super spreading, which can exceed 100 individuals and are apparently seeded by a single index case.<sup>[11-13]</sup>

**INTRODUCTION**

Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). While a novel coronavirus namely called as 2019-nCoV is a new strain that has not been previously identified in humans.<sup>[14]</sup>

Coronaviruses are zoonotic, meaning they are transmitted between animals and people. Detailed investigations found that SARS-CoV was transmitted from civet cats to humans and MERS-CoV from dromedary camels to humans. Several known coronaviruses are circulating in animals that have not yet infected humans.<sup>[15]</sup>

This novel virus, so far called 2019-nCoV, is known to have killed 170 people in China and infected more than 7,000. It has also spread to 16 other countries. It's a newly identified member of the coronavirus family - common infections which cause cold-like symptoms, a fever, coughing and respiratory problems. Many people who get this new virus will only suffer mild symptoms, and most are expected to make a full recovery. But like SARS (also a coronavirus) and influenza, this new one appears to pose a particular risk for elderly people and those with pre-existing illnesses. There is no cure, in the same way that there is no cure for the common cold.<sup>[14-15]</sup>

A virus - previously unknown to science - is causing severe lung disease in China and has also been detected in other countries. At least 200 people are known to have died from the virus in China, which appeared in the city of Wuhan in December, with around 10,000 cases nationally.<sup>[14,16]</sup>

There have also been cases in other 22 countries, including in the India, but no deaths. Experts expect the number will keep rising.

A new virus arriving on the scene, leaving patients with pneumonia, is always a worry and a health official around the World Health Organization has declared a global emergency.

Officials in China have confirmed the cases are caused by a coronavirus. These viruses are a broad family of viruses, but only six (the new one would make it seven) are known to infect people.<sup>[14,16-17]</sup>

Basically these Coronaviruses are a family of viruses that cause disease in animals. Seven, including the new virus, have made the jump to humans but most just cause common cold-like symptoms. Two coronaviruses – Middle East respiratory syndrome (Mers) and severe acute respiratory syndrome (Sars) – are much more severe, having killed more than 1,500 people between them since 2002.

The new virus, known as Wuhan coronavirus (2019-nCoV), is also more dangerous. So far, around 15 to 20 per cent of hospital cases have been classed as "severe" and the current death rate stands at about two per cent. This is much lower than MERS or SARS but still a significant threat is continue.<sup>[16]</sup>

### Probable Sources of Coronavirus

New viruses are detected all the time are jumped from one species, where they went unnoticed, into humans. "If we think about outbreaks in the past, if it is a new coronavirus, it will have come from an animal reservoir."

Many of the early coronavirus cases were linked to the South China Seafood Wholesale Market, in Wuhan. But the earliest documented case, which has been traced back to 1 December, had no connection to the market.<sup>[18]</sup>

SARS started off in bats and then infected the civet cat, which in turn passed it on to humans. And Middle East respiratory syndrome (Mers), which has killed 858 out of the 2,494 recorded cases since it emerged in 2012, regularly makes the jump from the dromedary camel.<sup>[19]</sup>

Once the animal reservoir (where the virus normally jumps out) is detected, then the problem may become easier to deal with. While some sea-going mammals can carry coronaviruses (such as the Beluga whale), the South China Seafood Wholesale Market also has live wild animals, including chickens, bats, rabbits, snakes, which are more likely to be the source.

The new virus is closely related to one found in Chinese horseshoe bats. However, this does not mean wild bats are the source of the outbreak - they could have passed the virus onto another species sold at the market.

### Symptoms

Common signs of infection include respiratory symptoms, fever, cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death.

According to the NHS and the WHO, symptoms of the Wuhan coronavirus usually include:

- Feeling tired
- Difficulty breathing
- A high temperature
- A cough and/or sore throat

These symptoms are similar to other respiratory diseases, including flu and the common cold. Symptoms are thought to appear between two and 10 days after contacting with the virus.<sup>[20]</sup>

### How is the New Conornavirus Spread?

Like cold and flu bugs, the new virus is spread via droplets when a person coughs or sneezes. The droplets land on surfaces and are picked up on the hands of others and spread further. People catch the virus when they touch their infected hands to their mouth, nose or eyes. Thus one should try to avoid touching your mouth, nose or eyes with unwashed hands – something we all do unconsciously on average about 15 times an hour.

At the beginning of the outbreak, the Chinese authorities said the virus was not spreading between people - but now, such cases have been identified. Scientists have said each infected person is passing the virus on to between two and three people. This figure is called the virus' basic reproduction number - anything higher than 1 means it's self-sustaining.<sup>[21]</sup>

This is not a virus that will burn out on its own and disappear. Only the decisions being made in China - including shutting down cities - can stop it spreading.

Many of these seeming new cases will have come to light as a result of China improving its ability to find infected people. Estimates by the University of Hong Kong suggest the true total number of cases could be far higher than official figures suggest. Their mathematical models of the outbreak suggest more than 75,000 people may have been infected in the Chinese city of Wuhan alone. Multiple groups have estimated the number of cases is doubling every week.<sup>[20-22]</sup>

### When People are Getting Infectious?

Chinese scientists say people are infectious even before their symptoms appear. The time between infection and symptoms - known as the incubation period - lasts up to 14 days.

SARS and Ebola are contagious only when symptoms appear. Such outbreaks are relatively easy to stop: identify and isolate people who are sick and monitor anyone they came into contact with. Flu, however, is the most famous example of a virus that you spread before you even know you're ill. Prof Wendy Barclay from the department of infectious disease at Imperial College London said it was common for lung infections to spread without symptoms.<sup>[23]</sup>

This novel virus is "carried into the air during normal breathing and talking by the infected person. We are not at the stage where people are saying this could be a global pandemic like swine flu. But the problems of stopping such "symptomless spreaders" will make the job of the Chinese authorities much harder."<sup>[24]</sup>

### How One Can Protect Themselves From Infection?

- Hand hygiene is the first and most important line of defense.
- Single most important thing you can do to protect yourself is to keep your hands clean by washing them frequently with soap and water or by a hand sanitizing gel.
- Also try to avoid touching your mouth, nose or eyes with unwashed hands – something we all do unconsciously on average about 15 times an hour.
- Carry a hand sanitizer with you to make frequent cleaning of hands.
- Always wash your hands before you eat.
- Be especially careful in busy airports and other public transport systems about touching things and then touching your face.
- Carry disposable tissues with you, cover your nose and mouth when you cough or sneeze and dispose of the tissue carefully (catch it, bin it, kill it)
- Do not share snacks from packets or bowls that others are dipping their fingers into.
- Avoid shaking hands or cheek kissing if you suspect viruses are circulating.
- Treating patients in isolation with healthcare workers wearing protective gear.

Children are a major vector for the spread of droplet-based viruses because they interact physically so much with each other and are not the best at keeping themselves clean. However, one can greatly lower the risk that children pose of spreading or catching viruses by:

- Explaining to them how germs spread and the importance of good hand and face hygiene
- Keeping household surfaces clean, especially kitchens, bathrooms and door handles
- Using clean clothes to wipe surfaces, so you don't transfer germs from one surface to another
- Giving everyone their own towel and making sure they know not to share toothbrushes etc
- Keep your home dry and airy (bugs thrive in musty environments)<sup>[25]</sup>

### Recommendation by WHO for general public

WHO's standard recommendations for the general public to reduce exposure to and transmission of a range of illnesses are as follows, which include hand and respiratory hygiene, and safe food practices:

- Frequently clean hands by using alcohol-based hand rub or soap and water;
- When coughing and sneezing cover mouth and nose with flexed elbow or tissue – throw tissue away immediately and wash hands;
- Avoid close contact with anyone who has fever and cough;
- If you have fever, cough and difficulty breathing seek medical care early and share previous travel history with your health care provider;
- When visiting live markets in areas currently experiencing cases of novel coronavirus, avoid direct unprotected contact with live animals and surfaces in contact with animals;
- The consumption of raw or undercooked animal products should be avoided. Raw meat, milk or animal organs should be handled with care, to avoid cross-contamination with uncooked foods, as per good food safety practices.
- Standard recommendations to prevent infection spread include regular hand washing, covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs. Avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing.<sup>[14, 26-27]</sup>

### Response of WHO on Coronavirus

WHO is working with public health specialists, animal health specialists, clinicians and scientists in affected and at risk countries and internationally to gather and share scientific evidence to better understand the virus and the disease it causes, and to determine outbreak response priorities, treatment strategies, and clinical management approaches. WHO is also working with the Food and Agriculture Organization of the United Nations (FAO) and the World Organization for Animal Health (OIE)

and national governments to develop public health prevention strategies to combat the virus.<sup>[14,24,27-28]</sup>

Together with affected countries and international technical partners and networks, WHO is coordinating the global health response to MERS, including: the provision of updated information on the situation; conducting risk assessments and joint investigations with national authorities; convening scientific meetings; and developing guidance and training for health authorities and technical health agencies on interim surveillance recommendations, laboratory testing of cases, infection prevention and control, and clinical management.<sup>[28]</sup>

The Director-General convened an Emergency Committee under the International Health Regulations (2005) to advise as to whether this event constitutes a Public Health Emergency of International Concern (PHEIC) and on the public health measures that should be taken. The Committee has met a number of times since the disease was first identified. WHO encourages all Member States to enhance their surveillance for severe acute respiratory infections (SARI) and to carefully review any unusual patterns of SARI or pneumonia cases.

Countries, whether or not MERS infections have been reported in them, should maintain a high level of vigilance, especially those with large numbers of travelers or migrant workers returning from the Middle East. Surveillance should continue to be enhanced in these countries according to WHO guidelines, along with infection prevention and control procedures in health-care facilities. WHO continues to request that Member States report to WHO all confirmed and probable cases of infection with MERS-CoV together with information about their exposure, testing, and clinical course to inform the most effective international preparedness and response.<sup>[14, 26-27]</sup>

#### **Initial Hospital Treatment For Coronavirus**

Those who get admitted to hospital are given treatment for their symptoms while their immune systems try to fight the virus off. Hospitalization also serves to isolate patients and stop the virus spreading.

In severe cases, the virus can cause pneumonia - an inflammation of the lungs. In those cases breathing may need to be supported. Patients are given oxygen and in the worst cases may be put on a ventilator. About one in four cases are thought to be severe. Image caption Patients who develop pneumonia - such as this patient in Wuhan - may need breathing support

"If a patient has respiratory symptoms they support breathing. If it is pressure on organs they would try to support the body in alleviating that pressure. In milder cases, patients struggling to maintain blood pressure can be given an intravenous drip. Fluids can also be given in

cases of diarrhoea, and ibuprofen is also available for pain relief.

#### **Vaccination and Treatment For Coronavirus**

Although there's no vaccine against the new coronavirus, tests are under way in China to see whether two antiviral drugs used to treat HIV - Lopinavir and Ritonavir - could be an effective treatment. These drugs were shown to help fight the SARS virus in 2003, after evidence emerged that HIV patients who were using the drugs and who also had SARS had better outcomes.<sup>[28]</sup>

However, the work to develop them is already under way. It is hoped that research into developing a vaccine for MERS, which is also a coronavirus, will make this an easier job.

Treatment at the moment relies on the basics. Patients are kept in isolation so they do not spread the virus; breathing support is given to people with the worst lung disease; and doctors manage the other conditions the patients have. In more severe cases, the virus causes pneumonia, an infection that inflames the lungs and causes breathing difficulty. This is where the main danger lies.

Instead doctors focus on supporting patients' lung function as best they can. They may be given oxygen or placed on a breathing machine (ventilator) in the most severe cases. Other symptoms such as fever and discomfort will be treated using drugs such as aspirin and ibuprofen. Secondary infections may be treated with antibiotics.

There is currently no vaccine but researchers in the US, UK and China has already begun working on one, thanks to China's prompt sharing of the virus's genetic code.

However, any potential vaccine will not be available for up to a year and would most likely be given to health workers most at risk of contracting the virus first.

For now, it is a case of containment. China has started building several 1,000-bed hospitals to treat patients which it hopes to finish within days.<sup>[26, 29-31]</sup>

#### **Mutation of Coronavirus**

We can expect viruses to mutate and evolve all the time. China's National Health Commission has warned the coronavirus's transmission ability is getting stronger, but they were unclear on the risks posed by mutations of the virus. This is something scientists will be watching closely.

Chinese officials have warned that the virus is already starting to mutate, which means there's a chance that the disease could start to infect many more people.

But from the studies it is found that the genetic sequence of the virus shows a slow mutation rate.<sup>[27]</sup>

**CONCLUSION**

Our recommendation is to conduct a continuous health education campaign about the awareness of coronavirus and also to provide the general guidelines & some basic information about symptoms, spreading pattern, mutation, infection, care and treatment of coronavirus.

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