

# **CORONAVIRUS DISEASE (COVID-19): MODE OF INFECTION, CONTROL AND IMMUNITY**

by

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## **Introduction**

The outbreak of the Severe Acute Respiratory Syndrome-related Coronavirus (SARS-CoV-2) have been reported throughout the world since December, 2019 till date, thus being regarded as a pandemic. This novel respiratory infection has been tagged COVID-19 and has since raised a global health concern, leading to severe mortalities. It has brought back memories of the global pandemic of SARS in 2003 which has been presumed to be of animal origin, sharing 96% similarity to a bat coronavirus. This is the first pandemic known to be caused by the emergence of a new coronavirus. This virus has also been tagged as Wuhan virus, as its outbreak was traced to its discovery at the Wuhan Institute of Virology, Wuhan, China PR.

## **Description**

They are members of the family Coronaviridae, enveloped and positive stranded RNA viruses. The virions are typically decorated with large, club-or petal-shaped surface projections (spikes) which in electron micrographs of spherical particles create an image reminiscent of the solar corona.

## **Pathogenesis and Clinical manifestation**

COVID-19 has 5 clinical variants based on severity;

- Asymptomatic form – in this form, one gets infected without manifesting any symptom whatsoever. The person thus ends up just as a mere carrier, spreading the infection to others.
- Mild disease –this affects the upper respiratory tract producing symptoms such as sneezing, mild fever, cough, malaise, etc; The infected individual recovers rapidly, with or without any supportive treatment.

- Moderate disease –this is a lower respiratory tract infection, which may present as pneumonia and would need some supportive treatment, but may not be sick enough to need oxygen therapy.
- Severe disease – this group develop severe pneumonia and get so sick that they need oxygen therapy.
- Critical disease – this group of patients get so bad and develop acute respiratory disease syndrome and ventilator respiratory failure, so much that they would need a ventilator to survive.

The form of the disease one develops depends on a host of factors including: Immune status, age and presence of other co-morbidities, such as diabetes, hypertension, heart disease, cancer, chronic lung disease, etc. Chronic obstructive pulmonary disease (COPD), cardiovascular diseases, and hypertension have been identified as strong predictors for ICU admission.

### **Incubation period**

The maximum incubation period is assumed to be up to 14 days, whereas the median time from onset of symptoms to intensive care unit (ICU) admission is around 10 days. The virus has been identified in respiratory tract specimens 1–2 days before the onset of symptoms, and it can persist up to 8 days in moderate cases and up to 2 weeks in severe cases. Recently, WHO reported that the time between symptom onset and death ranged from about 2 to 8 weeks.

### **Mode of Transmission**

- Respiratory droplets, via coughing and sneezing
- Fomites, including beddings, cloths, metals, doorknobs, plastic and stainless steel, ATM keyboard, handset, handbags, purse etc.
- Faecal – oral route
- Airborne

### **Signs and Symptoms**

- Fever
- Headache
- Coughing

- Chest pain
- Throat infection
- Vomiting
- Diarrhoea
- Difficulty in breathing
- Death

### **Treatment**

- There is currently no approved specific treatment or vaccine against COVID-19 infection. Patients require supportive care and oxygen supplementation. This can be done through non-invasive ventilation (if performed in a negative pressure room or through a helmet) or via mechanical ventilation.
- A number of pharmaceuticals are being used for severe and critically ill patients as potential treatments against SARS-CoV-2, including ribavirin, interferon  $\beta$ -1a, the antiviral combination lopinavir/ritonavir, the antimalarial chloroquine/hydroxychloroquine, the antiviral nucleotide analogue remdesivir and the antiviral favipiravir and antibiotic, azithromycin (ECDC, 2020).
- It is important that the available pharmaceuticals are carefully assessed in randomised controlled trials (RCTs); several clinical trials are recruiting patients globally to assess the effect of different treatment options.
- Boosting of the immune system through consumption of fruits that are rich, natural sources of vitamin C (Citrus fruits such as orange, lemon, grapefruit etc, pawpaw, strawberries), vegetables (broccoli, cauliflower, capsicums etc) and nuts (almond, groundnuts etc)
- Non-conventional therapies: decoctions, concoctions and infusions using garlic, tumeric, onions, black seed oil (*Nigella sativa*), neem
- Steaming: inhalation of steam from hot water or decoctions etc

### **Prevention and Control in the Community**

- Rigorous hand-washing schemes, including the washing of hands with soap and water for at least 20 seconds, or if soap and water are not available, cleaning hands with alcohol-

based solutions, gels or tissues is recommended in all community settings in all possible scenarios.

- Respiratory etiquette (i.e. covering the mouth and nose when coughing and sneezing). Afterwards, disposal of used tissues in a covered bin followed by immediate hand washing with soap and water.
- People with mild symptoms may stay home but anyone with progressing acute respiratory symptoms should seek medical attention by phoning the medical team to come for him.
- Household contacts of a person confirmed to have COVID-19 should be quarantined for 14 days after their last contact with the case, while household contacts of a person with symptoms compatible with COVID-19 should also be encouraged to quarantine at home for 14 days after the symptoms of the household contact have resolved.
- Social distancing by minimizing the number of contacts and increasing physical distance between potentially infected individuals and healthy individuals (at least 6 feet), or between population groups with high rates of transmission and population groups with no or a low level of transmission.
- Isolation and quarantine of COVID-19 cases or people with respiratory symptoms.
- Stay-at-home policies aimed at people who are at high risk of severe disease, closure of educational institutions and workplaces, measures to limit outside visitors and limit the contact between the residents of confined settings, such as long-term care facilities and prisons, cancellation, prohibition and restriction of mass gatherings and smaller meetings, mandatory quarantine of all inhabitants of buildings or residential areas, internal or external border closures and stay-at-home restrictions for entire regions or countries.
- Vaccination: development and clinical trials of vaccines against COVID-19 are on going to determine potent ones. This however will take some time to arrive at.

## **Immunity**

- Evidence from other coronavirus infections (SARS and MERS) has indicated that actively produced antibodies in infected individuals might confer protection against this disease.

- Emerging evidence from early studies suggests that individuals develop antibodies after infection and are likely to be immune from reinfection with the virus.

The rapid outbreak of this infectious disease has reshaped thinking on various levels of public health approaches in combating its menace. Awareness and safety measures are thus necessary to foster positive health attitude and hygiene practices so as to contain its spread.

### **Reference**

European Centre for Disease Prevention and Control (ECDC). Coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK – seventh update. 25<sup>th</sup> March, 2020. Stockholm: ECDC; 2020.

