



## The Disease of the Mouth Covers: What Do We Know?

Ibrahima Kalil Keita<sup>1\*</sup>, Yemelín Riverón Alvarez<sup>2</sup> and Ali Rafael Sangróni<sup>3</sup>

<sup>1</sup>Specialist in General Surgery, Specialist in Family and Community Medicine, Divina Providencia Hospital, Ministerio de Salud Publica, Ecuador

<sup>2</sup>General Practitioner, Resident of General Surgery, Provincial Hospital, Santiago de Cuba

<sup>3</sup>Internal Medicine Specialist, Chief of Medicine Service, Divina Providencia Hospital, Ecuador

**\*Corresponding Author:** Ibrahima Kalil Keita, Specialist in General Surgery, Specialist in Family and Community Medicine, Divina Providencia Hospital, Ministerio de Salud Publica, Ecuador.

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### Abstract

Coronaviruses are a wide family of viruses that can cause various conditions, from the common cold to more serious diseases. The usual symptoms are fever (38 - 40°C), respiratory manifestations due to dry cough and dyspnea as well as sore throat and headache. In the most severe cases, they can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death. The power of dissemination is not yet known exactly; According to some authors, one in four patients develops a serious infection and one in 10 patients die from serious infections. Regular hand washing and covering or protecting the mouth, nose and eyes are recommended as elementary preventive measures. The case fatality or mortality of those infected increases significantly with age: 60 years (1.5%), 60 - 70 (3.6%), 70 - 80 (8%), over 80 (15%). Children and young people have a very low case fatality, but they are possible asymptomatic carriers [3].

**Keywords:** COVID-19; Coronavirus; SARS; Pandemic; Mouth Covers

### Introduction

Let's start by saying that viruses are very simple, and often pathogenic, microorganisms that have to be introduced into a cell to live and reproduce. Viruses are made of genetic material and have a protein coat that is sometimes completed with a light layer of lipids or fats that increases their survival outside the host. This survival is estimated in hours by some researchers and in a few days by others. It is interesting to establish precisely this time, since it greatly influences the contagion phenomena. Since lipids are soluble in alcohol, disinfection of the hands with this product is recommended.

The WHO defines coronaviruses as "a broad family of viruses that can cause a variety of conditions, from the common cold to more serious illnesses, such as the Middle East respiratory syndrome coronavirus (MERS-CoV) and the coronavirus that causes respiratory syndrome acute severe (SARS)" [1].

The coronavirus was first isolated from chickens in 1937, by Beaudette and Hudson [2].

After the discovery of rhinovirus in the 1950s, more than 50% of colds still could not be attributed to known agents. In 1965, Tyrrell and Bynoe used embryonic ciliated tissue cultures of the human trachea to reproduce the first coronavirus *in vitro*. Today approximately 13 species of this family are known, some of which infect humans.

Coronaviruses, responsible for the 2019 - 2020 epidemics originating in Wuhan, and technically known as COVID-19, are a family of viruses that closely resembles the SARS virus, responsible for the 2002 - 2003 SARS epidemic.

The usual symptoms are fever (38 - 40°C), respiratory manifestations due to dry cough and dyspnea as well as sore throat and headache. In the most severe cases, they can cause pneumonia, severe acute respiratory syndrome, kidney failure, and even death.

Regular hand washing (soap removes fat) and covering or protecting the mouth, nose and eyes are recommended as elementary preventive measures.

In the context of this outbreak, it has been observed that in China there was a duplication of cases weekly which speaks of the rapid spread of the virus. The power of dissemination is not yet known exactly; According to some authors, one in four patients develops a serious infection and one in 10 patients die from serious infections.

In Spain; the first case occurred in La Gomera (Canary Islands), on January 31, 2020, in an infected German in his homeland. On March 8, 617 infections and 17 deaths were registered in Germany.

Italy, with 60 million inhabitants, presented its first case on February 21; on March 2 it already had 2,000 infected and 52 dead, proportionally to its population, it is the most affected European country.

It is interesting to note that, in general, the case fatality or mortality of those infected increases significantly with age: 60 years (1.5%), 60 - 70 (3.6%), 70 - 80 (8%), older 80 (15%). Children and young people have a very low case fatality but are possible asymptomatic carriers [3].

Estimates of the initial mortality rate from China (2.3% in the largest case series) indicate that it appears less severe than SARS (10%) or MERS (35%); mortality increases with age [4].

## Properties of coronaviruses

### Structure and composition

Coronaviruses are enveloped, large RNA viruses implicated in a wide variety of diseases that affect humans and animals. They belong to the family of Coronaviridae, Genus of Torovirus (Arterivirus).

In humans they can cause a common cold and gastroenteritis in infants. They are very difficult to grow in the laboratory, so few have been able to characterize and study them in depth.

Coronaviruses are spherical with an approximate size between 80 and 220 nm in diameter. They have a helical nucleocapsid 9 to 11 nm in diameter and a positive polarity (27 to 32 kb) linear single-stranded (single-stranded) RNA genome, the genomes are polyadenylated at the 3' end. They have glycoproteins distributed on the surface of the outer layer of the envelope, in the form of a golf club or a petal of 20 nm in length giving it the appearance of a crown (hence the name). These viruses have the largest genome and are highly infectious when introduced into eukaryotic cells. They replicate in the cytoplasm, mature in the endoplasmic reticulum and the Golgi apparatus, and emerge by budding.

The virus structural proteins comprise a 50 to 60 kDa phosphorylated nucleocapsid (N) protein, a 20 to 35 kDa membrane glycoprotein (M) serving as a matrix protein embedded in the lipid double layer of the envelope, and that interacts with the nucleocapsid, and the spike glycoprotein (S; 180 to 220 kDa) that constitutes the petal-shaped peplomers. Some viruses, including the human coronavirus OC43 (HCoV-OC43), contain a third glycoprotein (HE; 65 kDa) that causes hemagglutination and has acetyl esterase activity.

There are numerous types of coronaviruses; however, to date 7 types of disease are known to be known in humans. Most of the time, 4 of the 7 types causes symptoms of common cold. Types 229E and OC43 are responsible for the common cold; Serotypes NL63 and HUK1 were discovered, which were also associated with the common cold. Rarely, they can cause serious infections of the lower respiratory tract, including pneumonia, especially in infants, the elderly, people with comorbidities such as high blood pressure, diabetes mellitus, kidney failure, immunosuppressed patients and others.

Currently (21<sup>st</sup> century) three types have caused respiratory infections in humans with major outbreaks of fatal pneumonia:

- SARS-CoV2 China, end of 2019, (COVID-19).
- The MERS-CoV it was identified in 2012 as the cause of Middle East respiratory syndrome (MERS).
- The SARS-CoV It was identified in 2002 as the cause of an outbreak of severe acute respiratory syndrome (SARS).

## COVID-19

COVID-19 is an acute, sometimes severe, respiratory disease caused by a novel SARS-CoV2 coronavirus.

### COVID-19 transmission

The first cases of COVID-19 were related to a live animal market in Wuhan, China, suggesting that the virus was initially transmitted from animals to humans. Person-to-person spread occurs through contact with infected secretions, primarily through contact with respiratory droplets, estimating a transmission rate of 2 to 3 people for each confirmed case. But it could also occur through contact with a contaminated surface; It is not known with certainty whether the infection can be contracted via the fecal-oral route, nor is it known with certainty how easily this virus spreads from person to person or how sustainable the infection will be in a population, although it seems more transmissible than the SARS and the spread is probably more similar to the flu.

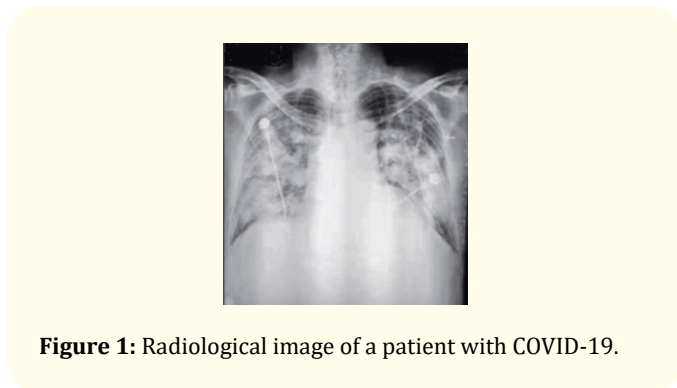
**Diagnosis**

The WHO initially considered an incubation period for COVID-19 of 14 days, and then extended it to 24, still with doubts, which seriously conditions the effectiveness of preventive projects.

People with COVID-19 may have few or no symptoms, although some become seriously ill and die. The most frequent symptoms are fever, cough and dyspnea. Some patients will present upper respiratory symptoms (cold, odynophagia), nasal congestion, general malaise, myalgia or asthenia. The elderly and immunosuppressed patients may present with atypical symptoms and, less frequently, there may be gastrointestinal symptoms (abdominal pain, diarrhea, nausea).

Analytical studies include cultures of respiratory secretions, real-time PCR, complete blood count and crisis, biochemistry including kidney, liver, ionogram, suspected respiratory failure, arterial blood gas, and lactate. Assess other possible comorbidities such as HIV, hepatitis, etc.

Patients with more severe disease may present with lymphopenia and chest imaging findings consistent with pneumonia (Figure 1).



**Figure 1:** Radiological image of a patient with COVID-19.

Most patients with severe forms of the disease show a two-stage evolution, with a progressive deterioration from the eighth day, with development of respiratory failure and radiological images compatible with “atypical” pneumonia (bilateral alveolar interstitial infiltrates), being able to arrive at respiratory distress syndrome (ARDS), shock and multiple organic dysfunction.

Some of the severity criteria are as follows: patients older than 65 years, Comorbidities, respiratory rate greater than 30 breaths per minute, Hypoxemia or SatO<sub>2</sub> less than 93%, altered pleuro-pulmonary examination, confusion/disorientation, hypothermia (central temperature < 36.8) among others.

To be more didactic, Dr. Ibrahima kalil keita and collaborators decided to create in the image of other authors a scale (Table 1) which is understandable for medical and non-medical personnel, which allows us to orient ourselves easily on the need to request assistance medical. If any of these criteria are present, infection control personnel at the health center and the state or local health department should be reported immediately. Similarly, above 4 points according to medical criteria associated with epidemiological parameters, the patient is a candidate for immediate medical assistance.

Symptom	Scores
Dry cough	4
Dyspnoea	4
Fever	1
odynophagia	1
General discomfort	1
Headache	1

**Table 1:** Scale created by Dr. Ibrahima Kalil, et al. for the Diagnosis of coronavirus infection. 0 to 3 observation points. 4 to 8 points ask for medical assistance, more than 8 points possible positive case.

**The sampling**

Samples should be collected by trained personnel and taking into account all biosafety instructions and appropriate personal protective equipment for respiratory viruses.

The recommended samples are those of the lower respiratory tract, including sputum, bronchoalveolar lavage, and tracheal aspirate. However, when it is not possible to take these samples, those from the upper respiratory tract are also useful. In general, it is recommended to take a nasopharyngeal swab combined with an oropharyngeal swab (swabs should be placed and transported in the same tube with viral transport medium). Although routine asymptomatic contact sampling is not recommended, if deemed necessary in accordance with the guidelines adopted by the country, sampling of the upper respiratory tract may be considered.

The WHO has made available 2 molecular diagnostic protocols, available at the following links [5]:

- Diagnosis for detection of the Wuhan coronavirus 2019 by real-time PCR RT-PCR - Charité, Berlin Germany: <https://bit.ly/3ap38yS>.
- Detection of novel coronavirus 2019 (2019-nCoV) in suspected human cases by RT-PCR - Hong Kong University: <https://bit.ly/2NGQG3W>.

Samples must be kept refrigerated (4 - 8°C) and sent to the laboratory where they will be processed within the first 24 - 72 hours. If they cannot be shipped within this period, it is recommended to freeze at -70 -80°C until shipment, guaranteeing the cold chain. Sending samples to reference laboratories must guarantee compliance with all Biological Substances Category B.

## Treatment

### Preventive measures

Listed below are some of the measures inherent to health personnel and to the population in order to prevent COVI-19 infection:

- Early recognition and control of the possible source of infection
- Hand hygiene
- Use of personal protective equipment according to risk assessment
- Respiratory hygiene
- Safe disposal of sharps and hospital waste
- Proper management of the environment and cleaning of the hospital environment
- Sterilization and disinfection of medical and hospital devices
- Training and education for health
- Guidelines on early recognition of acute respiratory infection potentially due to nCoV
- Access to rapid laboratory tests to identify the etiological agent.

Avoid overcrowding, especially in emergency services:

- Provision of specific waiting areas for symptomatic patients and adequate disposition of hospitalized patients that promote an adequate patient-health personnel relationship.
- Adequate environmental ventilation in areas within health facilities.
- Institute droplet/aerosol core and contact precautions if aerosol-generating procedures are performed, such as tracheal intubation, noninvasive ventilation, tracheostomy, cardiopulmonary resuscitation, manual ventilation before intubation, and bronchoscopy for suspected cases.
- The separation of at least 1 meter distance between patients and between patients and doctors must be respected.
- Empirical implementation of additional precautions according to transmission mechanism.

- Isolate people who are suspected of having the disease or have been in direct contact with COVID-19 positive patients (a condition for this is having traveled to countries with positive cases in the past few days).
- Use a common chinstrap, coverall and gloves if you are going to attend confirmed or suspected cases.
- Continue to provide travelers, who arrive and leave the country, information that stimulates and facilitates the search for medical care in the event of an illness occurring before, during, or after an international trip.
- Promote good practices and behavior among travelers arriving and leaving the country to reduce the overall risk of acute respiratory infections during travel, such as observing cough etiquette and frequent hand washing.

There are no vaccines for this virus today. For SARS and MERS, the search for a vaccine has been ongoing for years, it is estimated that this virus is likely to be included in development.

China has truly effective advanced pneumonia drugs in development, especially Rendesvir. They have also experimentally found that Chloroquine acts as a coronavirus inhibitor in France.

Thailand is testing a combination of Lopinavir and Ritonavir.

There is not yet enough evidence to say that antivirals that are already on the market are effective, but there are already clinical studies to determine their effectiveness.

What can be done with patients today is symptomatic treatment and support of functions.

### Patient discharge

Investigational cases where COVID-19 is ruled out will be guided by standard clinical criteria. Before discharge, it is essential to establish communication with the level to which the patient will be referred. General stability values are considered: heart rate < 100 beats per minute, respiratory rate < 24 breaths per minute, axillary temperature < 37.2°C, systolic blood pressure > 90 mmHg, SaO<sub>2</sub> > 90% if there was no previous respiratory failure, level of proper awareness [6-14].

### Conclusion

We consider the following measures necessary: Meeting of sanitary experts in epidemiology and virology. Call for the collaboration of pharmaceutical companies specialized in control tests and antiviral treatments. Reduction of the times in the approval protocol of these medications. You consult Chinese, French and Cuban advisers

who are experts in the recovery process for those affected. Greater rigor in sanitary controls at customs for visitors.

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