

# Coronavirus disease 2019 (Covid-19): a preventive approach for healthcare professionals

## Abstract

**Objective:** The purpose of this work as revealed through a recent literature review is to present the clinical characteristics of the disease caused by the coronavirus (COVID-19), the known transmission routes, address how health professionals can identify suspected cases, and mainly, how to present preventive measures to control and minimize infection.

**Materials and methods:** The bibliographic search in databases such as Scielo, Medline, Ministry of Health<sup>1</sup> and Fiocruz, among others, from March 28-30, 2020, was conducted to collect research data. Inclusion criteria consisted of articles in their complete and free version, in Portuguese as well as English language. Results: The coronavirus infection presents symptoms such as fever, cough, sneezing and phlegm although some cases are considered mild. The main routes of transmission are direct and by contact. In order to identify suspicious cases, patients' body temperature must be measured. Health professionals must frequently wash their hands before and after treatment and use personal protective equipment.

**Conclusion:** At times like this when society is experiencing pandemic disease outbreaks, new challenges arise for health professionals and others who work in areas at risk of contacting the disease.

**Keywords:** COVID-19, coronavirus, health professionals, biosafety, pandemic

Volume 9 Issue 3 - 2020

**Caren Leticia de Souza Milani Barbosa**

Nurse, Bachelor of Nursing from the Faculty of Biomedical Sciences of Cacoal-FACIMED, Specialist in Adult and Pediatric ICU, Brazil

**Correspondence:** Caren Leticia de Souza Milani Barbosa, Nurse, Bachelor of Nursing from the Faculty of Biomedical Sciences of Cacoal-FACIMED, Specialist in Adult and Pediatric ICU, Brazil, Email milani.aren@hotmail.com

**Received:** April 20, 2020 | **Published:** June 03, 2020

## Introduction

Pandemics are defined as epidemics of infectious diseases that spread rapidly over large geographic regions and travel around the world within the same period of time. Outbreaks of pandemics in recent centuries include the Russian flu (1889-1890) infecting 1.5 million people, the Spanish flu (1918-1919) infecting 50 million people, the Asian flu (1957-1958) infecting 1-4 million people, the Hong Kong flu (1968-1970) infecting 1-4 million people, HIV/AIDS (1981-today) infecting 32 million people, influenza A (2009-2010) infecting 100 to 400 thousand people, the Ebola virus (2014-2016) infecting 11.3 thousand people, and the coronavirus (2019-today) infecting 11,000 since March 20, 2020. In the last twenty years, the coronavirus has been responsible for two major pandemics, the Severe Acute Respiratory Syndrome (SARS)-CoV in 2002 and the Middle East Respiratory Syndrome (MERS)-CoV in 2012.<sup>2,3</sup>

In December 2019, an outbreak of pneumonia caused by a new strain of the coronavirus originated in the city of Wuhan, China, spread rapidly around the world. The disease that the virus produces was classified as COVID-19 where 'CO' means corona, 'VI' stands for virus and 'D' stands for disease. In the past, this disease was called "2019 new coronavirus" or "2019-nCoV". The World Health Organization (WHO) declared COVID-19 a public health emergency and a disease pandemic, on January 30, 2020 and March 11, 2020, respectively.<sup>4</sup>

The new coronavirus is a beta virus; it can cause respiratory infections and more rapidly spreads than the previous types of coronaviruses. The SARS and MERS viruses also cause severe respiratory diseases and belong to the beta-coronavirus (B-coronavirus). This virus has a membranous structure of protein spines and penetrates cells through the cell receptors of the angiotensin-converting enzyme 2 (ACE 2).<sup>2</sup>

Bats and humans are considered susceptible hosts to the 2019-nCoV. There is also speculation about the presence of an intermediate host called the Pangolin (scaly anteaters) which is a mammalian that inhabits tropical regions of Asia and Africa.<sup>5</sup>

Available data on the new coronavirus suggests that it has a high capacity for infection, but relatively low lethality. The first findings suggest that the lethality is lower than that of H1N1 and other coronaviruses. Until February 9, 2020, of the 37,251 confirmed cases in China, 6188 (16.6%) were classified as serious and 812 resulted in deaths (2.2% overall and 13.2% among severe cases). Individuals with chronic diseases such as diabetes and cardiovascular and respiratory disorders are also subject to increased lethality.<sup>6</sup>

Health professionals who are at the forefront of this pandemic must be highly trained to receive a patient and know how to handle the situation. Due to the emergence of new COVID-19 cases, health professionals must be protected against the heightened risk of infection while treating patients. In cases of patients with respiratory symptoms, whether the coronavirus or another transmittable virus, the adoption of the use of masks, eye protectors, and facials are recommended in direct care; avoiding contact with people suspected with the disease is also indicated in various situations. In addition, hygiene care such as properly washing your hands and not sharing personal items and covering your nose and mouth when coughing and sneezing will help prevent the spread of disease.

The objective of this work is to review the recent literature that details the present clinical characteristics of the disease caused by the coronavirus (COVID-19), its known transmission routes, how health professionals can identify suspected cases, and mainly, to present preventive measures to control and minimize infection. It is expected to understand the forms of prevention and incorporate

measures to minimize the spread of the virus to ensure the biosafety of health professionals. It is important to evaluate the care, and if necessary, institute a review of current processes to minimize possible complications affecting the quality of service and patient safety.

### Materials and methods

Bibliographic research in databases such as Scielo, Medline, Ministry of Health and Fiocruz, among others with the keywords COVID-19, coronavirus, health professionals, and biosafety from March 28-30, 2020. Inclusion criteria consisted of articles in their complete and free version, in Portuguese as well as on the English language. Thus, the present work involves reading the articles to understand the studied phenomenon. Therefore, the analysis documentary involves the main technique of data captured. The present study has no conflict of interest.

### Results and discussions

In the last 20 years, Brazil has made important advances in epidemiological surveillance. In 2003, the influenza A H5N1 virus was the motivation for the elaboration of the First Contingency Plan for Pandemic against Influenza. This plan defined the guidelines for the strengthening of the country’s epidemiological surveillance with the establishment of networks of laboratories and sentinel units for severe acute respiratory syndromes, a national network for the alert and response to health emergencies, the CIEVS (Centre for Strategic Information and Response Health Surveillance), in addition to investments in the national production of an influenza vaccine.<sup>6</sup>

In 2009, treatment of the influenza A H1N1 virus involved a more structured network that was able to respond with efficient surveillance. The state of Sao Paulo at that time stood out for its’ laboratory capacity, while Parana, for the sensitivity of its network. This experience allowed the laboratories to improve their typing of viral subtypes and expand the tests performed, in addition to expanding the SARS surveillance network in the country. In 2015, Brazil was protagonist in advancing knowledge about the Zika virus.

In 2019 with the arrival of the SARS-CoV-2, the SARS surveillance protocol in Brazil did not routinely include measures for the coronavirus as part of the laboratory examination panel. It was only explored in cases of deaths and outbreaks by the National Influenza Laboratories (NICs) with the exception from the State

of Parana where the Central Public Health Laboratory (LACEN) includes seasonal types in its’ TR-PCR panel.<sup>7</sup>

In view of the situation posted by the new SARS-CoV-2, on January 31, 2020, the Ministry of Health of Brazil established the Interministerial Working Group on Public Health Emergency of National and International Importance to monitor the situation and define protocols for action for the surveillance of the viral outbreak in the country. The protocol established the collection of two samples for all patients seen in the public health system of not only suspected cases presenting the characteristic symptomatic condition, but also of individuals with a history of recent travel to regions exposed to direct transmissions and/or a contact with a suspected or confirmed case.

According to the aforementioned author, samples collected by health professionals must be processed by LACENs for screening. Testing for respiratory viruses are part of the SARS surveillance panel and it is up to the states to establish the local test for the COVID-19 as well. Negative or inconclusive cases will be processed by the NICs for specific testing for the COVID-19 by being carried out by parallel metagenomic analysis. In addition, in order to minimize the impact of the notification and typing delay, priority notification channels were established without the need for hierarchical notification (municipality/state/federation) and a quick viewing platform for the disclosure of suspected cases by the Integrated Health Surveillance Platform.

The virus can survive on various surfaces for several hours or even days, but with proper hygiene and precautions simple disinfectants can kill it. The elderly and individuals with chronic medical conditions such as diabetes and heart disease are at risk for developing severe symptoms of the disease. Being that it is a new virus, its’ behaviour in children is still under investigation. Although we know that it is possible for people of any age to be infected with the virus, but this far there are relatively few cases of COVID-19 reported among children. The virus in some cases which are fatal occur mainly among the elderly with pre-existing conditions.<sup>2,8,9</sup>

COVID-19’s person-to-person routes of infection include direct transmission such as coughing and sneezing, transmission by inhalation of droplets, and transmission by contact with oral, nasal, and ocular mucous membranes. Transmission can also occur through saliva and potentially the oral-faecal route (Table 1).<sup>5</sup>

**Table 1** According to the SARS–COVID-2 human infection protocol (coronavirus disease invite-19), suspected, probable, confirmed cases or close contact are classified according to the table below

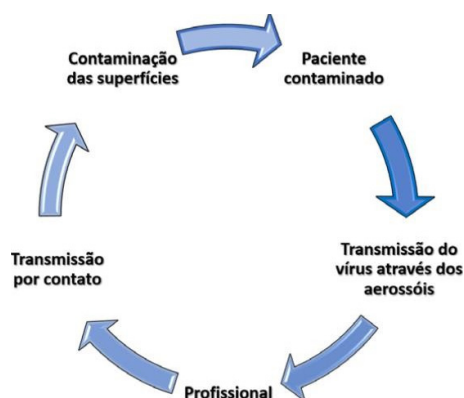
<b>Suspected case</b>	Fever and at least one respiratory sign or symptom (cough, difficulty breathing, nasal flushing, among others) with a history, in the last 14 days of the appearance of signs or symptoms: <ul style="list-style-type: none"> <li>· Travel to area with local transmission, according to WHO;</li> <li>· Close contact of suspected or confirmed coronavirus cases (COVID-19).</li> </ul>
<b>Probable case</b>	· Close home contact of a confirmed laboratory case, presenting fever and / or any respiratory symptoms, within 14 days after the last contact with the patient
<b>Confirmed case</b>	· Laboratory criteria: positive result in RT-PCR, per protocol approved by the Ministry of Health <ul style="list-style-type: none"> <li>· Epidemiological clinical criteria: close home contact of a confirmed laboratory case, presenting fever and / or any respiratory symptom, within 14 days after the last contact with the patient and for which the specific laboratory investigation was not possible</li> </ul>
<b>Close contact</b>	Being approximately two meters from a patient suspected of having a new coronavirus, within the same room or service area, for a prolonged period, without the use of personal protective equipment (PPE). <p>Close contact may include: caring for, living in, visiting or sharing a medical assistance area or waiting room or in cases of direct contact with body fluids, while not using the recommended PPE</p>

Source: Human SARS infection protocol –COVID-2 (Invention 19 coronavirus disease)

This information infers that it is necessary to carry out preventive and control measures to avoid the high rate of viral infection. The implementation of standard precautions is the main measure of prevention of the COVID-19 viral transmission between patients and health professionals which must be adopted in the care of all individuals (prior to the arrival at the health service, screening, & waiting and during all assistance provided) regardless of risk factors or underlying diseases. The ensured internal policies and practices minimize exposure to respiratory pathogens including the COVID-19 (SAUDE).<sup>10</sup> As there is currently no vaccine to prevent the COVID-19 infection, the best way to prevent its' disease is to avoid exposure to the virus. Daily preventive actions that help prevent the spread of the respiratory viruses include the following:

- Frequent hand hygiene with soap and water or alcoholic preparation.
- Avoid touching eyes, nose, and mouth without proper hand hygiene.
- Avoid close contact with sick people.
- Cover mouth and nose when coughing or sneezing with flexed elbow or using a disposable handkerchief.
- Stay at home and avoid contact with people when you are sick
- Clean and disinfect frequently touched objects and surfaces.
- Go to the health unit if you present with signs and symptoms.
- Follow all guidelines made by the health team.

Other measures that prevent the transmission of respiratory viruses involves the hand hygiene cleanses at essential and necessary moments according to the flow of care. The right action at the right time guarantees safe care for patients (Figure 1).<sup>11</sup>



**Figure 1** Routes of transmission of the new COVID-19 coronavirus.<sup>5</sup>

The management for these cases is to evaluate the patient and establish the conduct according to each clinical picture presented. Mild cases should be managed with non-pharmacological measures such as rest, hydration, and adequate food, in addition to analgesics and anti-thermals and home isolation for 14 days from the date of onset of symptoms. Monitor contacts of especially patients who are over the age of 65 and/or under the age of 2, have chronic lung, kidney, or heart disease, or who are pregnant women. Depending on the condition of isolation, assess the possibility of hospitalization.<sup>10,12</sup>

In severe cases that do not indicate admission to intensive care, management hospitalized patients with isolated beds. Start antiviral (Oseltamivir) therapy. Start antibiotic therapy. Request additional

tests including blood count, blood gas analysis, blood cultures, LDH, CPK, kidney function, chest x-ray, and other tests provided at medical discretion. Collect biological material for viral detection, if not done before hospitalization. Carry out notification and notify SARS (Severe Acute Respiratory Syndrome) form (Periodic Clinical Evaluation).<sup>11,12</sup>

Some patients who present with a severe condition should be admitted to an intensive care unit preferably in hospitals with isolated beds. Start antiviral (Oseltamivir) therapy. Start antibiotic therapy. Request additional tests including blood count, blood gas analysis, blood cultures, LDH, CPK, kidney function, chest x-ray, and tests order at medical discretion. Collect biological material for viral detection if not done before hospitalization. Notify as instructed in item 4.2 and notify the hospitalized SARS form (Periodic Clinical Evaluation).<sup>10</sup>

Evidence indicates that both pregnant and puerperal women do not have increased individual risk. However, measures must be taken to protect the child who has a higher risk of developing SARS due to the influenza virus. Many patients can be treated early by a health professional to make the disease less dangerous.<sup>12-15</sup>

## Limitations of the study

The present study had its limitations due to the little content found and the translation of most of the manuscript for the construction of the research.

## Contributions from study to practice

It is expected that the present study will contribute to further research, leading to a reflection on the valorization of health professionals who are on the front line combating the new coronavirus to prevent its spread, thus ensuring patient safety and quality of care provided in health services.

## Conclusion

At times like this when society is experiencing outbreaks of a pandemic disease, new challenges arise for health professionals and others who work in areas of high risk must respond with greater care involving biosafety, ethnics, zeal, and updated and periodic training.

Professionals must be trained in the handling and conduct of the patients' arrival thus contributing to their safety and that of their families.

The knowledge of this in reality allows us to value the need to restructure the current health system in perspective of consolidating the principles of SUS.

## Funding

None.

## Acknowledgments

None.

## Conflicts of interest

The author has declared that there was no conflict of interest.

## References

- Brasil P, Pereira JP, Moreira ME, et al. Zika virus infection in pregnant women in Rio de Janeiro. *N Engl J Med*. 2016;375:2321-2334.

2. Hao Xu, Liang Zhong, Jiabin Deng, et al. High expression of ACE2 receptor of 2019-nCoV on the epithelial cells of oral mucous. *Int J Oral Sci.* 2020;12(1):8.
3. Martins, Eloi. Changes in behavior, in the economy and at work: how pandemics transform the world. 2020.
4. De Campos Tuñas, Inger Teixeira, et al. Coronavirus disease 2019 (COVID-19): A preventive approach to dentistry. *Magazine.* 2019.
5. Xian Peng, Xin Xu, Yuqing Li, et al. Transmission routes of n2019-nCoV and controls in dental practice. *Int J Oral Sci.* 2020;12(1):9.
6. Lana RM, Coelho FC, Costa Gomes MF, et al. The novel coronavirus (SARS-CoV-2) emergency and the role of timely and effective national health surveillance. *Cadernos de Saúde Pública.* 2020:36.
7. Health Surveillance Secretariat, Ministry of Health. Brazilian plan of preparation for coping with an influenza pandemic. 2020.
8. Laishuan W, Yuan S, Tiantian X, et al. Chinese expert consensus on the perinatal and neonatal management for the prevention and control of the 2019 novel coronavirus infection (First edition). *Ann Transl Med.* 2020;8(3):47.
9. World Health Organization (WHO). Coronavirus disease (COVID-19) outbreak. 2020.
10. Health ministry. Protocol of treatment of the new coronavirus (COVID - 19). *Specialized Health Care Secretariat and Department of Hospital, Home and Emergency Care.* 2020.
11. State plan for the prevention and control of SARS CoV2 (COVID-19). Victory, 2020.
12. Protocol for the clinical management of coronavirus (covid-19) in primary health care. Secretariat of Primary Health Care (SAPS): Brazil; 2020.
13. Codeço CT, Cordeiro JS, Lima AWS, et al. The epidemic wave of influenza A (H1N1) in Brazil, 2009. *Cad Saúde Pública.* 2012;28:1325-1336
14. Info Gripe. Flu situation. 2020.
15. Health Surveillance Secretariat, Ministry of Health. Human infection with the new coronavirus (2019-nCoV). *Epidemiological Bulletin.* 2020; (02).