

## Health professionals fight against COVID-19

The novel coronavirus (SARS-CoV-2) is the worst infectious disease outbreak that Brazil has faced. The disease named COVID-19 is potentially fatal and represents a great global public health concern in the last 100 years, compared only to the Spanish influenza that killed around 25 million people between 1918 and 1920. The SARS-CoV-2 pandemic emerged in the city of Wuhan, central China, and transmission is linked to a seafood and wet animal wholesale market.<sup>(1)</sup> The virus has spread rapidly in China, Asia and thereafter, within two months, reached all continents.

SARS-CoV-2 is highly contagious and transmission occurs mainly through respiratory droplets and contact routes, particularly in closed environments and health care facilities. An infected person by the novel coronavirus can transmit the virus to other two or three individuals depending on the environmental conditions. This transmission rate is the basic reproductive number, which for COVID-19 ranges between 2.0 and 3.5. The epidemic control occurs when the reproductive number of the disease is reduced to less than 1, and then allowing the number of cases to start to reduce slowly. The circulation of the virus was believed to be considerably mitigated when the reproductive number reaches less than 0.2. The virus can remain in the environment from hours to days depending on the surface and environmental conditions. The novel coronavirus is easily neutralized with standard disinfectants used in the hospital environment, including 70% ethanol and/or sodium hypochlorite. The environmental hygiene is fundamental against the virus mainly in hospitals.

An important transmission factor of COVID-19 is the higher viral load in the upper respiratory tract, even among pre-symptomatic patients, which is a fact that distinguishes this disease from other respiratory diseases. For many individuals, mainly in older people, the infection symptoms-based diagnosis is even harder: many patients do not experience fever, present chronic cough caused by other diseases, or shortness of breath for previous heart failure. An outbreak in a skilled nursing facility in the USA, the symptoms-based strategy for identifying infected residents was insufficient to prevent COVID-19 transmission.<sup>(2)</sup>

Health professionals are at a higher risk for the infection. In Brazil, as well as in other countries, thousands of health professionals have to leave their positions due to COVID-19 infection and many have died.<sup>(3,4)</sup> In Italy, 20% of frontline health professionals fighting COVID-19 were infected and many have died.<sup>(3)</sup>

Data of health professionals team providing frontline care for COVID-19 show physical and mental exhaustion, difficult in triage decision, anxiety for the pain of losing a patient and a colleague, all in addition to the infection risk and possibility of passing the infection to their family.<sup>(3)</sup> To guarantee health care and psychological support for health professionals is critical. In addition, symptomatic healthcare workers should be screened for the COVID-19 as fast as possible.

The real-time polymerase chain reaction (RT-PCR) is indicated for symptomatic healthcare workers, and the optimal timing for oro/nasopharyngeal sample collection is between the third and seventh day of symptoms onset. In some individuals, the RT-PCR can remain detectable for long periods, from 2 to 6 weeks, however, in most of cases, they represent inactive genetic material without transmission importance. Serological tests are able to detect levels of IgM, IgA, and IgG antibodies through a number of automatized immunoassays techniques using chemiluminescent, immunoenzymatic methods, and immunochromatographic assays (rapid test – less sensitive). In general, they provide sensitivity of 60 to 70% on the 7<sup>th</sup> day and of 90% after the 10<sup>th</sup> day. The presence of IgM or IgA antibodies confirms acute infection and positive IgG antibodies indicates previous contact with SARS-CoV-2, and this can be related to immunity to the virus. We do not know whether infection means neutralizing antibody and long-lasting immunity. Therefore, even health professional with a positive IgG should use personal protective equipment (PPE) when in contact with suspected or confirmed cases of COVID-19.

Health professionals caring for aging parents or children are directly affected by schools closure and social distancing policies. However, without vaccine or specific treatment against SARS-CoV-2, the home isolation, social distancing, and use of facemasks associated with hygiene measures can reduce at the same time the virus transmission and the number of people who will seek for hospital care. This is the adequate situation for the public health system to address the demands of severe cases, and also to avoid collapse of the health care network.

As the epidemic grows in Brazil, the adequate provision of PPEs for health professionals is a constant concern. The scarcity of PPEs is being observed in a number of Brazilian facilities as well as in many countries.<sup>(5)</sup> The provision of PPEs in health institutions must be a state policy, governments must mobilize the national industry to respond to this challenge. Unfortunately, this is not what we have been seen, costs of PPEs, especially disposable aprons and facemasks, have been significant inflated in association with disruptions in the supply. Brazil stills depending on China industry for supplying of PPEs.

Hospitals need to face the challenging of hiring qualified healthcare workers during the COVID-19 crisis. Trained professionals who are able to provide care with quality and safety to the patient with COVID-19 are not easy to find quickly, especially health care providers to work in intensive care units. SARS-CoV-2 causes more than respiratory failure that leads to

hospitalization. In severe cases, uncontrolled release of cytokines has been observed mainly the IL-6 with an intense inflammatory response, which determining septic shock and thromboembolic phenomenon related to disseminated intravascular coagulation.<sup>(1)</sup> Some patients needed hemodialysis and had evolved with cardiological complications that required experienced professionals to make decision and treat complications.

COVID-19 also show the social inequalities in Brazil. The epidemic emerged in wealthy neighborhoods but the number of cases in low-income neighborhoods is rapidly growing, like the capital of Sao Paulo, Brazil, where poor urban areas show a higher number of deaths.<sup>(4)</sup> We could not forget that many health care workers leave in poor urban areas of cities and a new infection wave will certainly reach hospitals and this may take many health care workers from their job position.

No country was prepared for COVID-19 outbreak, and this fact imposes important negative effects on the economy, medical care, and mental health of the whole society. The main challenges for hospitals are to reorganize the care provided, to increase the number of beds in the intensive care units, to guarantee supplying of PPEs, and to have adequate number of trained professionals available. Research funding is required to better understand the disease, and to find efficient drugs and a vaccine. Along the way, health care providers need learn with this crisis by following health institution recommendations and protocols, improving communication, empathy, and keeping up to date to face this major historical challenge.

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