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A CRITICAL REVIEW OF CURRENT HEALTH CHALLENGES

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ABSTRACT

In times of pandemic caused by COVID-19, health has gained even greater prominence about its importance for human life. In this sense, it is valuable to understand what are the main challenges, because, as mentioned, the pandemic and its effects have brought visibility as to the precarious aspect of health in different parts of the world. In Brazil, for example, hospital units did not have the basic equipment needed to face the crisis. Therefore, this article aims to present considerations about contemporary challenges in society. The methodology used is qualitative research, with data collection through bibliographic review.

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INTRODUCTION

Since the emergence of a new coronavirus disease in China in December 2019, the disease-causing virus has spread to 210 countries and territories around the world, infecting about 159,304,320 people worldwide and causing more than 3 million deaths (World Health Organization https: //www.worldômetros.info/coronavirus/). As a background, a group of patients with pneumonia of undetermined etiology emerged in Wuhan, China, in December 2019. The stories and information collected from these early patients trace this virus (and are even linked in some ways) to the animal market in Wuhan. These observations led to the theory that pneumonia cases of unknown cause may have an etiological factor, potentially emerging from said market (Rothan & Byrareddy, 2020). Subsequently, it was reported that person-to-person transmission occurs by direct contact and/or by respiratory droplets (Li *et al.,* 2020b). This mode of transmission of the COVID-19 virus has led to the rapid spread of the disease to almost all parts of the globe. The World Health Organization named the disease as Coronavirus disease 2019 (COVID-19), while the International Committee on taxonomy of viruses named the new virus as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) on February 11, 2020 (Tang *et al.,* 2020). Especially in Wuhan, a large number of people infected with COVID-19 have been, in some way, exposed to the wet animal market, hypothesizing that animals are the most likely origin of this new coronavirus. Currently, mammals and birds are the only known reservoirs of this virus.

For example, analysis of the novel coronavirus showed that 88% of the covid-19 genome is shared with bat-derived Severe Acute Respiratory Syndrome (SARS), such as coronavirus, and about 50% of the genome is compatible with Middle East Respiratory Syndrome (MERS-CoV) (Rothan & Byrareddy, 2020). These analyses have shown that mammals are the most likely link between humans and coronavirus disease 2019 (COVID-19). These genomic studies have also shown that COVID-19 is part of the beta-coronavirus genus, being able to infect humans, bats and animals. However, studies have shown the COVID-19 route as bat-to-human, while subsequently it has spread worldwide by human-to-human transfer. Mainly, it has been reported that the COVID-19 virus is transferred by respiratory droplets (Li *et al.,* 2020b) and by direct contact from one human to another (Li *et al.,* 2020c). In an interesting recent study, in pregnant women in the third trimester, no evidence was found for vertical transmission of this virus from mother to child (Rothan & Byrareddy, 2020) however, transmission during vaginal delivery is still uncertain. As for the signs of illness, COVID-19 is symptomatic, as well as asymptomatic. COVID-19 has a structure similar to that of SARS-CoV, which binds to human lung epithelial cells via angiotensin-converting enzyme 2 (ACE-2). Similarly, COVID-19 is likely to bind to the same location, i.e. ACE-2 (Li *et al.,* 2020b). The virus duplicates in host cells and directly causes inflammation of the lung, which causes the respiratory symptoms associated with COVID-19. And, during lung inflammation, a large number of cytokines are released, leading to excessive activation of the body's immune response (Li *et al.,* 2020b).

Patients with mild illness recovered in about 7 days, while patients with severe COVID-19 progressed to respiratory failure due to acute respiratory distress syndrome, which can even lead to death, in some circumstances (Adhikari *et al.,* 2020). Symptoms of COVID-19 begin after an incubation period of approximately 5.2 days (Rothan & Byrareddy, 2020). In about 15% of patients, the disease progresses to a severe and sometimes fatal form of pneumonia. Severe COVID-19 can lead to respiratory distress, multiple organ failure, and intravascular coagulopathy (Lippi & Henry, 2020). The main symptoms of COVID-19 fever, at this point, are fatigue, headache, cough (productive or non-productive or even both), dyspnea, and gastrointestinal symptoms such as diarrhea, nausea, and vomiting (Tang *et al.,* 2020). These clinical features can present as acute respiratory distress syndrome (ARDS), acute cardiac injury, and increased incidence of ground-glass opacities in the chest, which can lead to death, in some cases (Rothan & Byrareddy, 2020). Chest X-rays of some COVID-19 patients showed multiple irregular shadows in both lungs (Xu *et al.,* 2020), while CT scans also showed bilateral ground-glass opacities (Rothan & Byrareddy, 2020). In addition to reaching the lungs, COVID-19 produces a systemic disease that reaches multiple organs and leads to multiple organ failure (Lippi, *et al.,* 2020). During the period of acute stress and an overwhelming immune response to the corona virus, the body releases an increased amount of catecholamines that have a direct toxic effect on the heart, leading to vasospasm, arrhythmias and sudden cardiac death (Channappanavar & Perlman, 2017). The release of angiotensin 2 caused by The Binding of the virus to ACE-2 receptors results in hypertension, cardiomyocyte hypertrophy and increased cardiac load, leading to the occurrence of coronary artery disease (Li *et al.,* 2020a). In another study by Xu and team (2020), biopsy samples taken from a patient who died of COVID-19 on the 14th day of the disease showed evidence of ARDS caused by the virus.

Histological examination showed diffuse bilateral alveolar damage and fibrous exudates. The lungs showed hyaline membrane formation and pneumocyte elimination. Interstitial infiltrates of lymphocytes were shown in both lungs, but no intra-nuclear or intra-cytoplasmic inclusion bodies were observed (Xu *et al.,* 2020). The study also demonstrated mononuclear infiltrates in the heart and moderate microvascular steatosis in liver tissues (Xu *et al.,* 2020). The synthesis mentioned above showed a range of studies that have recently moved beyond the focus of medical research work on the genomics, infection patterns and epidemiology of COVID-19. But the work of healing and treatment, especially vaccine preparations, is still in its infancy. Although global health systems have not been sufficient to deal with this pandemic, and most importantly, health personnel and their health are being largely neglected during the COVID-19 pandemic. The frontline soldiers in this unforeseen battlefield are doctors, nurses and other paramedic teams who deal daily with covid-19 suspects and patients with precautionary measures merely available worldwide, consequently putting their lives and well-being at risk for the good of humanity.

Theoretical Framework

Biomarkers play a large role in the identification of disease, progress and pathology, and also in the treatment and management of diseases. Although COVID-19 is a novel coronavirus with a lack of established biomarkers, there have been studies in patients diagnosed with the disease to confirm specific levels of markers to help identify the disease and its severity. Thrombocytopenia is common in sick patients, and in a recent study, decreased platelet counts were found to be associated with a tripled risk of severe COVID-19 (Lippi *et al.,* 2020). This, in turn, can lead to intravascular coagulopathy. Because the lung can be the site of platelet release, ARDS caused by the virus can result in disruption and fragmentation of these platelets. Lymphocyte count is also associated with severity in COVID-19. Peripheral CD4 and CD8 counts also decreased in covid-19 patients. Lymphopenia was common in patients, but its state was hyperactivated, with high concentrations of cytotoxic granules and perforins in CD8 cells (Xu *et al.,* 2020). Higher inflammatory cytokines such as IL-6, IL-7, IL-1RA, IL-9, IL-10 have been observed in patients, with elevated levels of C-reactive protein (CRP), while erythrocyte sedimentation rate (ESR) and D-dimers have also been found in almost all COVID-19 patients (Rothan & Byrareddy, 2020). In addition, dyspnea and oxygen saturation (SpO2) were used in another study as prognostic biomarkers. Patients who reported shortness of breath as an initial symptom of COVID-19 were more likely to die than those who did not report these initial symptoms. As a continuous variable, it was found that for each unit increase in SpO2, the risk of mortality decreased by approximately 8%. Dyspnea and SpO2 were significantly associated with multivariate outcomes (Xie *et al.,* 2020). But, none of these reports have yet claimed conclusive biomarkers to affirmatively ensure medical identification of COVID-19 disease in experimental coronavirus patients. Therefore, much remains to be done in this regard to better assist the world's health systems against the COVID-19 pandemic. Currently, the diagnosis of COVID-19 depends on the real-time polymerase chain reaction (RT-PCR) assay of nasopharyngeal and throat swabs. Although, human involvement and technical problems exist for such a diagnosis. For example, sampling by a single trained nurse and several nurses exhibited an effect on diagnostic results. For appropriate sample collection, a highly trained or experienced nurse can improve diagnostic sensitivity with swabs (Ye *et al.,* 2020).

Embora o cotonete lingual seja conveniente, mas pode possivelmente produzir o mesmo artefato. No entanto, a taxa positiva de esfregaços da garganta é maior do que os esfregaços linguais para a detecção de COVID-19, quando foi coletado por uma única enfermeira experiente (Ye *et al.,* 2020). When several nurses collected lingual and throat samples, there was no significant advantage from each other. In fact, the diagnostic sensitivity of COVID-19 increased when samples were collected from both sites (Ye *et al.,* 2020). And, this dual-nature sensitive diagnosis requires more manpower, time, and money, all of which cumulatively cause a major limitation to an efficient health care system. For molecular diagnosis, the E, N, and S genes of the SARS-CoV-2 virus are the detection targets often used by RT-PCR (Van Kasteren *et al.,* 2020). According to some reports, RT-PCR reported only 57% of positives among samples from fever clinics that showed symptoms of the virus. Several patients had progressive multiple ground-glass opacites in the lungs but negative PCR results (Wang, 2020). Different manufacturers of PCR kits for the diagnosis of COVID-19 are: Altona Diagnostics, BGI, CerTest Biotec, KH Medical, Primer Design, R-Biopharm AG, Seegene etc. A comparison between these commercial kits was also made by van Kasteren and his team. According to their results, all kits had PCR efficiency higher than 96%, while the detection of the viral genome through these kits showed different results. Biopharm positively detected the largest number of clinical samples, i.e., 13/13. BGI, KH Medical and Seegene detected 12 of 13 samples. CerTest Biotec 11/13, Altona Diagnostics and Primer Design detected 10/13 samples correctly (Van Kasteren *et al.,* 2020). In parallel, the S, N, E, and M genes of the virus are the main antigenic targets of antibodies against this virus (Li *et al.,* 2020a). Different kits for the antigen detection test for the SARS-CoV-2 virus are RapiGen, Liming Bio, Savant and Bioeasy. Bioeasy showed the highest accuracy for the detection of antigens with 89.2% accuracy. As for antibodies, IgM and IgG are produced within 5–7 days and 10–15 days of infection, respectively (Li *et al.,* 2020a).

And manufacturers of antibody detection tests include Maglumi, Alltest, Clungene, VivaDiag, StrongStep, OrientGene, Dynamiker, and MultiG. The specificity of these kits is greater than 85%, while the total sensitivity ranges from 32% for the detection of a specific antibody to 84% (Li *et al.,* 2020a). A combination of both methods, RT-PCR and antibody tests increases the sensitivity of infection detection by 98.6% (Wang, 2020) The combination of both methods is beneficial for screening and confirmation of COVID-19, also in advanced stages of the disease, because the viral load fluctuates at different stages (Wang, 2020). Studies have also reported chest CT scans with sensitivity of 80–90% and specificity of 82–96% for detecting lung lesions in patients with COVID-19 (Majidi & Niksolat, 2020). On the cure side of COVID-19, at the moment, there are no antiviral drugs or specific vaccines for the treatment or manhandling

of COVID-19. The major therapies with which patients are being treated are broad-spectrum antiviral drugs, such as antiretroviral drugs, such as nucleoside analogues and HIV protease inhibitors (Rothan & Byrareddy, 2020). Other antiviral medications used are interferon, ganciclovir and oseltamivir. The immediate use of corticosteroids should, however, be considered for patients to prevent SDRA development, along with ventilation (Xu *et al.,* 2020). A combination of two HIV protease inhibitors, i.e., Lopinavir and Ritonavir, was also put to test and a slightly lower number of deaths were found in patients who received this regimen, but it does not affect viral elimination and therefore no benefit was observed for clinical improvements (Baden & Rubin, 2020). As COVID-19 is mainly a respiratory disease, the development of SDRA and the consequent hypoxemia can lead to severe respiratory insufficiency and ultimately to death. Therefore, it is imperative that monitoring of the vital signs, specifically from SpO2, is done quickly. In the presentation, oxygen supplementation is provided by nasal cannula or mask in scenarios of severe to severe compromised respiratory disease. Non-invasive ventilation is not done in critical ARDS and pneumonia associated with COVID-19, because non-invasive ventilation, in no way, affects the course of the disease (Ñamendys-Silva, 2020). In patients with acute refractory respiratory insufficiency, intubation and invasive ventilation, made in a timely manner, are superior to both high level oxygen therapy and ventilation with two levels of positive pressure in the airways (Meng *et al.,* 2020).

All these manhandling strategies result in better oxygenation, opening of the collapsing alveoli due to SDRA and shorter healing time of the lungs. But currently, the isolation and quarantine of positive COVID-19 patients and individuals, and strict measures to minimize personal contact, remains the only way to decrease the spread of COVID-19 (Baden & Rubin, 2020). Although, visibly, health professionals during the diagnosis and treatment of COVID-19 are at constant risk of being infected and / or staying physically and psychologically compromised. Health care professionals are the real frontline soldiers around the world against COVID-19 and / or any other similar situation. However, taking care of patients is professional duty of the healthcare professionals, but their leisure and rest are also very important.The sudden coronavirus pandemic stretched medical resources all over the world to the limit. Many countries that are being hit hard by the disease face an immense shortage of health professionals, fans and basic necessities such as masks, gloves and personal protective equipment. Facing a disease of such proportion and such a nature requires a large amount of goods and resources. The average hospital only has enough supplies for an average patient load. The epidemic that swept through the countries was completely unnecessary and therefore led to a global shortage of resources. To deal with the COVID-19, the most important resource to be used is the workforce of health professionals. As so far, no specific treatment has been asserted for COVID-19, the manhandling of infected patients depends mainly on support care only. Therefore, the ongoing monitoring and treatment of an unpredictable and exceptionally large number of patients infected with the COVID-19 virus has led to negative impacts on health workers in and out of the hospital environment. In this regard, the problems faced by health professionals include increased work journey, exhaustion, fatigue, stress, psychological imbalance, emotional stress, personal protective equipment (EPIs) below the standard, increased risk of infection, physical health problems and anxiety of health care professionals themselves and also their families. All of these factors combine to compromise the effectiveness of the hospital, its workforce, and workflow.

In this way, much of the combat to the COVID-19 pandemic and the further reduction of its spread depends on the well-being and livelihood of workers who have assumed the maximum responsibility for dealing with the disease on the front lines. The more effectively the health care professionals are used, the better the world can fight against the pandemic as the coronavirus (Fraher *et al.,* 2020). The recommendations in the following sections can therefore contribute to elevating the empowerment of efficient health systems around the world. The increased work journey and several shifts to cope with a large number of patients with COVID-19 have resulted in exhaustion and fatigue of the health professionals. This, in turn, can compromise the efficiency of care provided to patients. In that sense, one way to deal with this ever-increasing flow of patients is to add more health professionals to the arsenal. This will help in the best management of the patients, as well as decrease the workload of existing health professionals. But, does the real dilemma be the challenge of how that number of medical personnel can be increased? For example, the whole process of evaluating patients with suspicion of COVID-19, their admission to the hospital, management, treatment, etc. depends on a large group of people working in different departments. The hospitals rely on screening, health professionals in the emergency room, nurses, staff of UTI and doctors. The increase in the number in different departments can therefore be a way to increase the workforce. In this regard, students (medical students and nursing students), either in the completion of studies or in the last year, can obtain a permit and be trained to deal with certain aspects of patient management. Health professionals, such as dentists, technicians, chiropractors, can also be trained to conduct examinations, screening, follow-up of patients and provide education to the community (Fraher *et al.,* 2020). In addition, volunteers from other similar life disciplines can also be called on to deal with certain aspects (e.g. administration) of patient management that have reduced or almost no contact with patients, such as telemedicine, data collection, and patient follow-up.

According to the available data, about 6.1% of patients with COVID-19 were classified as critical (respiratory failure, dysfunction of multiple organs etc.) and 13.8% as severe (SpO2 <92%, increase in lung infiltrators> 50%), while in Italy, 12% of all cases required admission and care in the ICU (Phua *et al.,* 2020). Health workers are expected to have an increased risk of infection due to their direct exposure to COVID-19 patients (Bhagavathula, Aldhaleei, Rahmani, Mahabadi, & Bandari, 2020). The International Council of Nurses (ICN) has gathered information that on average 7% percent of all confirmed COVID-19 patients are health workers (ranging up to 18% percent) with more than 600 deaths on the nursing team in June 2020. These 7% percent of the total infected patients around the world would raise the number to about 1,393,000 health workers infected with COVID-19, based on estimates. The ICN has further shown concerns that governments around the world are closing their eyes on this matter, unfortunately, by not collecting the data in a systematic way, nor reporting this information to international forums, which can cost even more lives (Catton, 2020). In the United States, being one of the most affected countries when there was no control of vaccines, a total of 124,813 health workers were affected, with deaths reaching 600 among health care workers, according to the Center for Disease Control and Prevention (on August 8, 2020). According to data compiled by Anadolu Agency, a total of 12,454 health workers were affected by COVID-19 in the Asia-Pacific region, while 171 succumbed to the virus (//www.aa.com.tr/en/asia). The number of doctors, nurses and paramedic teams infected with the virus in Pakistan is 3,196 and 31 health professionals, including 20 doctors, 2 nurses, 8 allied nurses and one medical student have lost their lives fighting the ongoing pandemic (https: //www .aa.com.tr / en / asia-pacific / asia-pacific-health-workers-hit-hard-by-covid-19/1873247).

Amnesty International (AI) has collected and analyzed a wide range of available data showing that it is known that more than 3,000 health workers have died after contracting COVID-19 in 79 countries across the world. According to the monitoring of AI, the countries with the highest number of health worker deaths so far include the US (507), Russia (545), United Kingdom (540, including 262 social workers), Brazil (351), Mexico (248), Italy (188), Egypt (111), Iran (91), Ecuador (82) and Spain (63). The analysis of data from one of the worst-hit countries, Italy, shows that 20% of all health workers dealing with patients had positive outcome for COVID-19 and infection among nurses accounts for 9% of the total cases (Ali, Noreen, Farooq, Bugshan & Vohra, 2020). The literature previously published in Spain, another country hard hit in Europe, indicated that about 9,400 health professionals were infected with the virus, which is almost 15% of all coronavirus cases in Spain (Ali *et al.,* 2020).

China has about 3,300 infected medical professionals, of whom 22 suffer from severe respiratory problems that have led to the deaths of these workers (Ali *et al.,* 2020). In short, around the world, the people responsible for the care of patients have been affected to an extent ranging from social workers, medical teams, nurses and doctors. As the above statistics are very alarming, it is of paramount importance that health professionals are protected from COVID-19 infection. In addition to maintaining one's own health for the job, health professionals act as a source, disseminating the disease, unknowable, to their family members and friends. In that sense, first of all, basic necessities such as gloves and masks should be made available in all hospitals. Individual protective equipment (PPE) is to be provided to health workers who deal with suspected and suspected COVID-19 patients. For example, the use of double gloves and double masks may limit direct contact transmission and the spread of respiratory droplets by cough and breath. The use of jackets and monkeys on monkeys or clothes may reduce the contact of clothes with possible infectious sources. After use, washing clothes and jewelry with alcohol containing 71% ethanol may potentially reduce possible infectivity (Kampf, Todt, Pfaender, & Steinmann, 2020). The gloves and masks should be discarded after use, as until now there is no process approved by the FDA for recycling materials and/or equipment already used. Disinfectants should also be provided in all health canters hospitals and the regular use of disinfectants should be a standard, especially among health professionals. In addition, the reduction in exposure time to patients may also help in low infection rates among health professionals. As stated above, increasing the number of health professionals will result in division of labor. Telemedicine could be incorporated into hospitals, which would help in the history, screening and evaluation of the severity of patients without them attending the hospital. Training should also be provided in the telemedicine sections of the health service, while hospitals and clinics should begin to concentrate and implement telemedicine as a main and primary method to evaluate patients. This benefits both health professionals and patients.

Telemedicine has the additional benefits of using quarantine health workers and retired health workers (Moazzami, Razavi-Khorasani, Dooghaie Moghadam, Farokhi & Rezaei, 2020). The protection of the medical team and medical staff should remain a primary and high priority concern during this COVID-19 pandemic. (Rana, Mukhtar e Mukhtar, 2020). In a study conducted in Singapore, of 500 health professionals, 14.5% were considered positive for anxiety, 8.9% for depression, 6.6% for stress and 7.7% were tested positive for PTSD (Tan *et al.,* 2020). The mood of health professionals also depended on the conditions of their patients. Many health professionals, especially nurses, were reported to be sad when a patient died (Liu *et al.,* 2020). The feeling of impotence and not doing enough when a patient dies, together with the sadness and the finding that his patient dies without his loved ones being on his side, cause a great emotional distress in many nurses (Law, 2020). These psychological symptoms were greater in nurses, women and other people taking care of patients with COVID-19. Many mental health problems between doctors and nurses result from the fact that they, without knowing, can transmit the virus to their own families (Lei, 2020). With this perception, the only way to contain transmission to family and friends is to socially isolate. Consequently, chronic long-term social isolation may increase the risk of a variety of health problems, such as heart disease, depression, dementia and even death, increasing mortality by up to 29% (Miller, 2020). It is therefore imperative that the mental well-being of health professionals be examined and prioritized. The importance of mental health should not in any way be impaired, as it is currently very crucial for the general well-being and efficiency of health professionals and, ultimately, their patients.

Very important, everyone has a way of distracting and taking care of themselves is fundamental. Therefore, health professionals should also exercise activities in their spare time to help them cope with stress. Health care professionals must continue their hobbies, whether at home or even in the hospital. This can be as simple as reading, meditation or something like exercise. Tackling mechanisms that harm health, such as smoking and alcohol, should, however, be avoided. Health professionals should also be encouraged to express themselves and communicate with each other and with people close to them. Awareness should be disseminated in relation to signs and symptoms of depressive fatigue, anxiety, among other disorders for health professionals, as well as for non-medical personnel involved in administrative tasks to deal with the pandemic situation of COVID-19.

Final Consideration

Public health, in fact, is the best defense - which is mainly possible with the well-being of health professionals worldwide. Therefore, the world must improve health systems and further emphasize public health through investment in new diagnostic and management tools. In this COVID-19 pandemic, while efforts are being made for treatment and vaccines, further efforts are needed for the support, well-being and safety of health professionals. These staff play the most important role in disease management and, therefore, the prosperity of health professionals is the main component during the fight against COVID-19.

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