




CLINICAL AND PATHOLOGICAL SCIENCES  
REVIEW ARTICLE

## COVID-19 and its relationship with vulnerable populations

## COVID-19 y su relación con poblaciones vulnerables

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**ABSTRACT**

**Introduction:** Currently, it is worth reflecting on who is most vulnerable to pandemics. Although it is true that COVID-19 has the potential to impact everyone in society, it will be greater in vulnerable populations.

**Objective:** To describe the relationship of

COVID-19 in vulnerable populations.

**Material and Method:** A bibliographic review was made from a total of 84 bibliographic references. Scientific articles in electronic format in English and Spanish were used; they were available from databases such as PubMed,



Scopus, Medline, SciELO, and the Google Scholar search engine. Websites of the Ministries of Health, WHO, PAHO, INFOMED and national and international web pages were also explored. The quality, reliability and validity of the selected articles were analyzed to carry out an adequate review.

**Development:** In the different vulnerable groups analyzed, the increased risk of contagion and the development of severe stages due to SARS-CoV-2 infection was evidenced. There is still no consensus regarding the management and

treatment of COVID-19 in older adults, people with comorbidity and immunosuppressed.

**Conclusions:** Vulnerable populations will be more affected by this pandemic; it is essential to develop equitable and egalitarian health policies in these groups.

**Keywords:** COVID-19; coronavirus; SARS-CoV-2; epidemiology; neoplasm; Diabetes Mellitus; overweight; obesity; HIV; disabled persons; health of the elderly.

## RESUMEN

**Introducción:** En este momento, vale la pena reflexionar sobre quién es más vulnerable a las pandemias. Si bien es cierto que la COVID-19 tiene el potencial de impactar a todos en la sociedad, sin embargo, este será mayor en poblaciones vulnerables.

**Objetivo:** Describir la relación de la COVID-19 en poblaciones vulnerables.

**Material y Método:** Se realizó una revisión bibliográfica a partir de un total de 84 referencias bibliográficas. Se utilizaron artículos científicos en inglés y español, en formato electrónico, disponibles en las bases de datos *PubMed*, *Scopus*, *Medline*, *SciELO*, y en el motor de búsqueda *Google Académico*, además se exploró en páginas web de los ministerios de salud, OMS, OPS, Infomed y páginas web nacionales e internacionales. Se analizó la calidad, fiabilidad y

validez de los artículos seleccionados para realizar una adecuada revisión.

**Desarrollo:** En los diferentes colectivos vulnerables analizados se evidenció el incremento del riesgo de contagio y a desarrollar estadios graves por infección del SARS-CoV-2, aun no existe un consenso en cuanto al manejo y tratamiento de la COVID-19 en adultos mayores, personas con comorbilidad e inmunosuprimidos.

**Conclusiones:** Las poblaciones vulnerables se verán más afectados por esta pandemia, es indispensable el desarrollo de políticas en salud equitativas e igualitarias en estos colectivos.

**Palabras claves:** COVID-19; coronavirus; SARS-CoV-2; epidemiología; neoplasias; *Diabetes mellitus*; sobrepeso; obesidad; VIH; personas con discapacidad; salud del anciano.



## INTRODUCTION

Coronaviruses are old acquaintances of humanity; these pathogens are characterized by mainly attacking the human respiratory system. Six types of coronavirus with the ability to infect humans were known; four of them cause a common cold and severe cases in immunocompromised people, the other two include Severe Acute Respiratory Syndrome (SARS) and Middle East respiratory syndrome coronavirus (MERS), which caused worldwide concern.<sup>(1)</sup> At the end of December 2019, several cases of viral pneumonia of unknown etiology were reported in China's Wuhan Hospital. A new outbreak of coronavirus, the SARS-CoV-2, was emerging. It was responsible for the coronavirus disease 2019 (COVID-19), named after the World Health Organization (WHO),<sup>(2)</sup> which started spreading throughout the world. The efforts made by countries to contain the virus and curb its spreading were insufficient and ineffective, thus becoming a global public health emergency, being classified as a pandemic by the WHO.<sup>(3)</sup> Vulnerability is defined as “continuous

exposure to risk”, which in terms of health, indicates the susceptibility of the person/s to health problems and damages, being a clear indicator of inequity and inequality.<sup>(4)</sup>

COVID-19 does not discriminate, attacking everyone without truce. Currently, it has expanded to 184 countries. Until April 23, 2020, a total of 2,629,801 confirmed cases and 183,470 deaths were reported, according to the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University.<sup>(5)</sup> Vulnerable people will be the most affected; in addition, they are those who have a greater probability of suffering devastating losses from COVID-19. According to the Centers for Disease Control and Prevention (CDC) of the United States, vulnerable groups are made up of: older adults, people with comorbidities, immunocompromised people including cancer treatment, pregnant women, and disabled people.<sup>(6)</sup>

The **objective** of this investigation is to describe the relationship of COVID-19 in vulnerable populations.

## MATERIAL AND METHODS

A bibliographic review was carried out between April 15 and 26, 2020. It included scientific articles in English and Spanish, in electronic format, available from PubMed, Scopus, Medline, SciELO databases, and the Google Scholar search engine. Websites of the ministries of health, WHO, PAHO, Infomed, and national and international websites were also explored.

For the collection of information, a search strategy was applied using health science

keywords and connectors such as: “coronavirus”, “COVID-19”, “COVID-19 and older adults”, “COVID-19 and obesity”, “COVID-19 and diabetes”, “COVID-19 and cancer”, “COVID-19 and HIV”, “COVID-19 and “COVID-19 and people with disabilities”.

The most recently published literature in relation to the subject area studied was considered as selection criteria. This review left a total of 84 bibliographic references used.



## DEVELOPMENT

### **What is COVID-19?**

SARS-CoV-2, which causes COVID-19, is a single-stranded RNA virus belonging to the Nidovirales order, Coronaviridae family and Orthocoronavirinae subfamily and becomes the seventh coronavirus to infect humans.<sup>(7)</sup> Phylogenetic analysis based on complete genomic sequences shows that bats are the reservoir of origin for SARS-CoV-2, and there is controversy between pangolin as an intermediate host animal.<sup>(8)</sup> SARS-CoV-2 has an oscillating mortality rate between 3 % and 4 % unlike SARS-CoV and MERS-CoV with 10 % and 35 %, respectively.<sup>(9)</sup>

SARS-CoV-2 transmission occurs predominantly through respiratory droplets and fomites. To date, transplacental transmission has not been described. However, neonatal disease due to postnatal transmission is described.<sup>(10)</sup> Fever, cough, and shortness of breath are the most common symptoms reported in 83 %, 82 % and 31 % of patients, respectively.<sup>(11)</sup> Patients who develop Acute Respiratory Distress Syndrome can quickly worsen and die from multiple organ failure. It has also been reported that around 2 to 10 % of patients with COVID-19 presented gastrointestinal symptoms such as diarrhea, vomiting, and abdominal pain;<sup>(12)</sup> additionally, other more infrequent symptoms are ageusia and agnosia.<sup>(13)</sup> For the diagnosis, they perform molecular tests such as RT-PCR and the IgM-ELISA serological test. The combination of both improves detection sensitivity.<sup>(14)</sup>

### **COVID-19 in older adults**

For the first time in history, there is a greater

probability that the population may reach the age of 60 years or more.<sup>(15)</sup> The existence of factors that contribute to and influence on the aging transition are complex; although SARS-CoV-2 infects people of all ages, the risk of becoming seriously ill increases with age starting at age 40, and especially in people over 60 years of age.<sup>(16)</sup>

### *Epidemiology*

Epidemiological data were collected from different countries affected by COVID-19. In the United States, older adults were found to be more likely to develop severe infection compared to other age groups. In Mexico, the average age of people infected by SARS-CoV-2 was 44 years,<sup>(17)</sup> while in Chile, they indicate that 7,2 % of the cases corresponded to people 60 years of age or older. Another study in Italy reported that the average age of people who died from SARS-CoV-2 was 81 years.<sup>(18)</sup> In addition, the WHO mission in China reported that most cases (77,8 %) range from 30 to 69 years; older adults have more severe symptoms.<sup>(19)</sup>

Regarding mortality, the Chinese Center for Disease Control and Prevention reported that the crude case fatality rate in China was 2,3 % in patients infected with SARS-CoV-2, with those over 80 years of age being most affected, presenting a fatality rate of 14,8 %.<sup>(20)</sup> Likewise, a study in South Korea reported that of 4,212 cases confirmed with COVID-19, 22 died; of these, 20 (90,9 %) were 50 years of age or older and had a fatality rate of 1,2 % vs. 0,2 % in younger people ( $p = 0.001$ ).<sup>(21)</sup>

Those people living in nursing homes are at greater risk of contagion by SARS-CoV-2, due to



the characteristics of collective coexistence such as confined spaces; the other side of the coin is for those who live alone, since facing this type of crisis is particularly difficult for this age group.<sup>(22)</sup>

#### *Recommendations for management and treatment*

Diseases in older adults tend to manifest atypically and present a vague and nonspecific clinical picture unlike other age groups.<sup>(23)</sup> Contributing factors include physiological changes typical of old age, presence of multiple conditions, presence of comorbidities associated with age such as heart and lung diseases, diabetes mellitus, senile dementia and polypharmacy.<sup>(24)</sup>

Fever is one of the most common symptoms and is a key screening method for the diagnosis of COVID-19; however, it has been shown that physiological changes in older adults affect thermal sensitivity, thus reducing their ability to detect and respond to temperature changes and making them vulnerable to thermal extremes.<sup>(25)</sup> In addition, coughing, fatigue and shortness of breath can occur due to age-related changes in lung tissue.<sup>(26)</sup>

Currently, there is no standard management in older adults infected with SARS-CoV-2; there are proposals that are still being investigated.<sup>(27)</sup> It is essential that older adults, family members, caregivers and medical personnel know the recommendations to avoid a future contagion. In a hospitalized older adult patient, monitoring of progressive signs and symptoms and progression of a pre-existing chronic disease are important.<sup>(28)</sup> From a biological point of view, aging is the consequence of the accumulation of molecular

and cellular damage over time, which leads to a gradual decrease in physical and mental capacities and makes them more vulnerable to COVID-19; for this reason, the implementation of preventive measures that reduce the spread of SARS-CoV-2 are priorities.<sup>(29)</sup>

#### **COVID-19 in overweight and obese people**

Recent studies reported that the prevalence of overweight and obesity worldwide was 39 % and 13 %, respectively, according to the WHO.<sup>(30)</sup> Likewise, it includes different risk factors that can lead to numerous chronic diseases, including diabetes, cardiovascular disease and cancer. Obesity plays an important role in the pathogenesis of SARS-CoV-2 infection. In fact, the immune system is key in the pathophysiology of obesity-induced inflammation of adipose tissue, which produces metabolic dysfunction.<sup>(31)</sup>

#### *Epidemiology*

Peng et al. performed a retrospective analysis of 112 patients with COVID-19 infection admitted to the Western Union Hospital District, in Wuhan, where they found that the body mass index (BMI) of the critical group (25,5 [23,0, 27,5] kg / m<sup>2</sup>) was significantly higher (p = 0,003) than that in people with an adequate BMI (22,0 [20,0, 24,0] kg / m<sup>2</sup>) and divided them into two groups: survivors (84,8 %) and non-survivors (15,18 %). Among non-survivors, 88,2 % had a BMI > 25 kg / m<sup>2</sup>, which is a significantly higher proportion than that of survivors (18,9 %) (p < 0,001).<sup>(32)</sup> Likewise, Liu et al. conducted a study at Jiangnan University Hospital where they compared patients with normal and high BMI; they found that those with the highest body mass were more likely to develop severe disease (27,0 ± 2,5)



compared to those who had an adequate BMI ( $22,0 \pm 1,3$ ) ( $p < 0,001$ ).<sup>(33)</sup>

One aspect to highlight is that during the H1N1 influenza (swine flu) pandemic, it occurred more in people with obesity and comorbidities.<sup>(34)</sup> For example, in the US, 268 H1N1 infected patients were reported in whom the BMI was calculated, 58 % had obesity (BMI > 30) and 67 % of them had morbid obesity (BMI > 40); also, 66 % of the obese, had underlying diseases associated with it.<sup>(35)</sup> Although the effects of SARS-CoV-2 in patients with obesity have not yet been fully clarified, the experience gathered from H1N1 influenza should serve to adopt preventive measures in patients with this history.<sup>(36)</sup>

Adipose tissue can serve as a reservoir for human Ad-36 adenovirus, influenza A virus, HIV, cytomegalovirus, *Trypanosoma gondii*, and *Mycobacterium tuberculosis*.<sup>(37)</sup>

#### *Recommendations for management and treatment*

There is currently no consensus for this clinical presentation, although it is well known that severe obesity is associated with sleep apnea syndrome, as well as with surfactant dysfunction, which may contribute to a worse scenario in the case of infection by COVID-19.<sup>(34)</sup> Furthermore, DM-2 and obesity may coincide in a determined patient; therefore, inadequate glycemic control may cause a deterioration in ventilatory function, thus contributing to a worse prognosis in these patients.<sup>(38)</sup>

The approach to people with obesity should be carried out by a multidisciplinary team, people with obesity should limit the energy intake from fats and sugars, they should increase the

consumption of fruits and vegetables, and carry out regular physical activity (60 minutes daily for young people and 150 minutes weekly for adults) inside their home due to social isolation.<sup>(39)</sup>

Therefore, it is recommended to have additional precautions for patients with obesity during this pandemic whenever a COVID-19 infection is suspected; detection should be systematic, especially if the patient is obese.<sup>(40)</sup> Adipose tissue may be a research model to help understand the pathogenesis of SARS-CoV-2 infection and thus develop an effective treatment.<sup>(41)</sup>

#### **COVID - 19 in people with Diabetes Mellitus**

People with Diabetes Mellitus (DM) have a higher risk of developing infections, as a result of multiple alterations in their innate immunity. Although humoral immunity does not appear to be affected, people with DM have a functional deficit of neutrophilic granulocytes, abnormalities in adhesion phenomena, chemotaxis and phagocytosis, and intracellular destruction of pathogenic microorganisms.<sup>(42)</sup> Apart from the defect in cellular immunity, there is currently available evidence that suggests a precarious humoral immune response, reflected in a lower production of antibodies and components of the complement system, which could influence the pathogenesis of infections.<sup>(43)</sup> Patients with DM-2 mostly present an excess of adipose tissue, which according to the pathophysiological processes, lead to an alteration of glycemic homeostasis and generates 2 important alterations (chronic hyperglycemia and chronic inflammatory state), which give a negative effect on the immunity of patients with



DM2 and make them more susceptible to infections; in this case, COVID-19 infection.<sup>(44)</sup> In fact, diabetes was considered an important risk factor for mortality in patients infected with Influenza A-H1N1, SARS, and MERS-CoV.<sup>(45)</sup> It is currently unknown whether people with DM have a greater susceptibility to SARS-CoV-2; however, there is evidence of increased risk for COVID-19 infection and the development of its final stages.<sup>(46)</sup>

#### *Epidemiology*

According to a retrospective study conducted in the Jinyintan Hospital in Wuhan, which analyzed 99 patients infected with COVID-19, 50 (51 %) patients presented chronic comorbidities; cardiovascular diseases with 40 (40 %) followed by DM in 13 (13 %) cases were identified among the main causes.<sup>(45)</sup> In addition, Wang et al. reported that of 138 COVID-19 positive patients, 64 (46,4 %) had 1 or more coexisting medical conditions such as hypertension (43 [31,2 %]), diabetes (14 [10,1 %]) and cardiovascular disease (20 [14,5 %]).<sup>(46)</sup> In Hong Kong, the first 3 victims of COVID-19 occurred in people with diabetes.<sup>(47)</sup> In China, of 1099 cases with COVID-19, 173 were classified as serious, 16 % of them had DM; in contrast, only 5,7 % of the remaining 926 cases with mild disease had DM.<sup>(48)</sup>

#### *Recommendations for management and treatment*

Due to the pandemic, diabetic patients are canceling their routine blood glucose checks; this is added to the increase in stress due to social isolation and the lack of physical activity that can aggravate their condition; the American Diabetes Association (ADA) recommends: continue with

the recommended dietary regimen, take the medication prescribed by a doctor, and carry out a more frequent monitoring of blood glucose levels. Exercise has also been shown to improve immunity, although it may be prudent to exercise caution and avoid crowded places.<sup>(49)</sup>

#### **COVID-19 in people with cancer**

Cancer patients are more susceptible to infection than people without cancer due to malignancy and anticancer therapy, which trigger a state of immunosuppression. In a retrospective study during the 2009 influenza A (H1N1) virus pandemic, cancer patients had a higher incidence of pneumonia (66 %) and 30-day mortality (18,5 %) compared to the population in general.<sup>(50)</sup>

#### *Epidemiology*

The Chinese Center for Disease Control and Prevention described and analyzed the epidemiological characteristics of 72,314 patients, of whom 107 (0,5 %) had chronic diseases such as cancer; 6 of them died, which represented a crude mortality rate of 5,6 % compared to others (2,3 %).<sup>(51)</sup> Another study in 1590 showed that, of the people infected with SARS-CoV-2, eighteen (1,13 %) had cancer. It was found that those affected by this pathology developed the most severe signs and symptoms, in turn worsening more rapidly unlike patients without cancer (39 % and 8 %,  $p = 0,003$ ). It should be noted that cancer patients who had chemotherapy treatment or underwent surgery had a higher risk of developing serious events compared to those who did not receive this type of treatment (OR = 5,34, 95 % CI 1,80–16,18;  $p = 0,0026$ ).<sup>(52)</sup>

Liang et al.<sup>(53)</sup> reported that of 28 cancer patients



with COVID-19 in three hospitals in China, 53,5 % developed serious events, 21,4 % entered the ICU, 35,7 % had life-threatening complications, and 28,6 % of them died.

#### *Recommendations for management and treatment*

Some reasons why cancer patients are at higher risk of SARS-CoV-2 infection are: constant admission of cancer patients and their families to hospital, hospitalization, more frequent in older adults, low immunity, cancer surgery, radiotherapy, chemotherapy, immunotherapy, poor general condition, diseases underlying cancer.

Another aspect to consider is the treatment received since it has been shown that cancer patients who have received antitumor treatment have been infected with SARS-CoV-2 during hospitalization; however, interruption or delay of treatment is not recommended, so its continuation must be accompanied by an adequate screening of the COVID-19 which should include: laboratory tests to rule out SARS-CoV-2, computerized tomography of chest, reverse transcriptase polymerase chain reaction (RT-PCR), and other nucleic acid amplification tests.<sup>(54)</sup> Treatments that cause immunosuppression should be avoided or the dose should be decreased. In addition, seven days before chemotherapy / radiotherapy, patients must remain completely isolated in the observation room; the recommendations are also directed to medical personnel and family members who must follow biosafety protocols.<sup>(55)</sup>

During treatment, cancer patients may need a

transfusion due to blood loss during surgery or to compensate for some side effects of chemotherapeutic drugs, as these cannot differentiate between cancer cells and normal cells; it is likely that blood donation centers experience loss of donors, workers, and reliable transport of specimens to national testing laboratories and increased response time of national testing laboratories.<sup>(56)</sup> WHO published a detailed guide to transfusion services for maintaining a safe and adequate blood supply during the COVID-19 outbreak.<sup>(57)</sup>

Limited but cumulative evidence suggests that cancer patients have a higher risk of COVID-19 infection than people without cancer, so their management should include clear information and education on hand hygiene, infection control measures, high-risk exposure, and the signs and symptoms of COVID-19.

#### ***COVID-19 in people infected with HIV / AIDS***

HIV / AIDS is understood as the human immunodeficiency virus. It is a chronic manifestation characterized by immunosuppression, leading to the development of opportunistic infections, secondary neoplasms and neurological manifestations, which has had an epidemic manifestation for long years, thus being considered a worldwide serious health problem.<sup>(58)</sup> These indicators show that the number of centers that provide antiretroviral therapy is 22,400; the number of people on antiretroviral treatment is 6,650,000; social distancing has reduced access to routine HIV testing, challenging the completion of UNAIDS 90-90-90 first global target, which mentions that 90% of all people living with HIV will know their





status.<sup>(59)</sup>

### *Epidemiology*

There is little scientific evidence on the risk of contracting SARS-CoV-2 in HIV patients. Zhu et al. reported co-infection of SARS-CoV-2 and HIV in a patient in Wuhan City, China, which could be considered the first case report to address this possible association and concludes that HIV infection should be considered as a risk factor for COVID-19. However, there is no identified interrelation between the two viral infections, this added to the fact that the patient did not receive antiretroviral therapy for HIV infection, making this possible association more controversial.<sup>(60)</sup> In another study carried out in Wuhan, China, out of 1,178 patients with HIV / AIDS, 12 of them had SARS-CoV-2 infection, and an incidence similar to that of the general population was found.<sup>(61)</sup>

### *Recommendations for management and treatment*

Currently, there is no standardized protocol for the management and treatment of patients with HIV and COVID-19; however, there are various controversies on the subject and all agree with strict compliance with retroviral medication to avoid the rapid and massive decrease in CD4 lymphocytes that causes the deterioration of the immune system. It is also advisable to follow the recommendations and hygienic-sanitary measures granted by the health authorities to the general population.<sup>(62)</sup>

Likewise, it is necessary to consider clinical management in primary care in various aspects of HIV treatment in association with COVID-19 by strengthening the health care network and its

professionals for the biological management of the disease, satisfying the biopsychosocial demand that will arise in the care process.<sup>(63)</sup>

For this reason, the Pan American Health Organization (PAHO), the World Health Organization (WHO) and UNAIDS have developed a set of public information messages and guidelines to communicate on COVID-19. Thus, new contingency plans have been developing in service delivery platforms, community, mobile units and outreach. An example of the plans is the distribution of a wide supply of antiretroviral drugs allowing adherence to treatment; another is the establishment of telemedicine, virtual / telephone and messaging systems, etc. to ensure care, avoiding the need to access an overloaded health system exposed to COVID-19.<sup>(64)</sup>

Regarding treatment, there is no indication that antiretrovirals used in people diagnosed with HIV can provide effective protection against the transmission of SARS-CoV-2; however, many ongoing clinical trials provide information about Lopinavir / Ritonavir and Chloroquine, being more effective in the early treatment and not waiting for multi-organ failure to occur.<sup>(65)</sup>

So the relationship between SARS-CoV-2 and HIV becomes important in the follow-up around two aspects: first, the pathogenicity of coronaviruses could increase in people with HIV + and impaired immunity, then we can recognize the potential that it has to illuminate the SARS-CoV-2 therapy, since it does not yet have an established protocol.<sup>(66)</sup>

Currently, a combination of human immunodeficiency virus type 1 (HIV-1) protease inhibitors, Lopinavir / Ritonavir and interferon



beta (LPV / RTV-INFb), has been shown to be effective in patients infected with SARS-CoV. LPV / RTV-INFb also improved clinical parameters in marmosets and mice infected with MERS.<sup>(67)</sup> The use of Remdesivir could be an excellent antiretroviral based on a study involving in vitro and animal data with MERS.<sup>(65)</sup> However, it is not commercially available and they are still conducting clinical trials. For the use of Lopinavir / Ritonavir (Kaletra) compared to Remdesivir that is widely available and the toxicity profile is known, a small study demonstrated effectiveness in the mechanism of action of these since they are protease inhibitors, which block viral replication; specifically, Ritonavir is a CYP3A inhibitor whose function is to decrease the metabolism of Lopinavir and this in turn acts on the virus, increasing its serum levels.<sup>(66)</sup> On the other hand, Chloroquine exerts antiretroviral effects through different mechanisms, since it has the ability to change the PH of endosomes, thus affecting viral replication, inhibiting viral gene expression. It can also change the Glycosylation pattern of the HIV-1 gp120 envelope (HIV-1) and eliminate replication of the HIV virus in TCD4 cells.<sup>(68)</sup>

To conclude, it is important that people living with HIV have accurate and up-to-date information about COVID-19 and HIV, know the protection measures, access to prevention services, care and treatment through the various strategies, since the pathogenicity of the Coronavirus may increase in HIV + people with more impaired immunity. They have also suggested that Lopinavir, an HIV protease inhibitor, may marginally inhibit coronavirus

replication; however, Remdesivir, which is an experimental nucleotide analogue adenosine, appears to efficiently block coronavirus replication, considering it as potential to shed light on COVID-19 therapeutics.<sup>(66)</sup>

### **COVID-19 in people with disabilities**

There are more than a billion people living with disabilities around the world. The WHO defines disability as "any restriction or absence due to a deficiency, the ability to carry out an activity in the manner or within the range considered normal for human beings"; This can be temporary or permanent, reversible or irreversible; it should be noted that the person "is not" disabled, but "is" disabled.<sup>(69)</sup>

COVID-19 threatens to exacerbate these disparities, particularly in low- and middle-income countries. Therefore, every State is under the obligation to provide guarantees for the mandatory preventive isolation measures for this group of people in compliance with their rights.<sup>(70)</sup>

So far, there is no statistical information or evidence on the impact of COVID-19 on this particular group or on their vulnerability. It is important to mention the emotional impact that could occur in most patients with disabilities due to social isolation and the interruption of their daily therapies. These changes could promote disruptive behaviors for each type of disability, due to increased stress. For this reason, some States have granted special permits for patients with disabilities to go out for short walks with a single companion, enforcing their rights.<sup>(71)</sup> Likewise, special care should be taken in disinfecting the different devices used such as



canes, wheelchairs, mobile devices and tablets in relation to visually impaired people. It is recommended not to move toiletries and disinfect them, providing them with facilities to use them.<sup>(72)</sup>

Therefore, it is essential to ensure that this group

### CONCLUSIONS

Before the arrival of COVID-19, millions of people in the world experienced vulnerable conditions. As this pandemic spreads throughout the world, it has revealed the shortcomings of the health systems of various countries, vulnerable

and their families have access to information about the pandemic and the measures to be taken according to each disability, such as sign language, pictograms, subtitles and other accessible formats.<sup>(73)</sup>

populations such as the elderly, people with chronic conditions, people with disabilities will be more affected compared to the rest, so it is necessary to include equitable and egalitarian policies in this type of group.

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### Conflict of interests

The authors declare that there are no conflicts of interest regarding the publication of this paper.

### Authorship contribution

**CRAC:** Conception of the idea, bibliographic search, critical review, writing and revision of the final manuscript.

**RCQA:** Bibliographic search, critical review, writing and revision of the final manuscript.

**KMHC:** Bibliographic search, critical review, writing and revision of the final manuscript.

All authors participated in the discussion of the results and we have read, reviewed and approved the final text of the article.

