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# Home Care as a Safe Alternative during COVID-19 Crisis

*Heloisa Amaral Gaspar and Claudio Oliveira Flauzino*

## Abstract

High mortality rate for the coronavirus disease (COVID-19) has been reported worldwide in nursing home residents, and the global concern about the safety of patients and professionals in these institutions is relevant. A large part of post-acute and chronic patient care in Brazil is performed at home through Home Care (HC) services. The objectives of this chapter are to describe the main measures that can be implemented in patient homes in order to keep professionals, patients, and family members safe and to analyze the safety of choosing the home as the place of care during a pandemic, especially in contrast to the results observed in long-term care facilities. COVID-19 infection data among home care patients, obtained after a year of severe epidemic in Brazil, demonstrate that home care is safe and is associated with a low incidence and low lethality related to the new coronavirus.

**Keywords:** Home care, safety, pandemic, COVID-19, professional protection equipment

## 1. Introduction

In Brazil, the first confirmed case of COVID-19 occurred on February 26th. Since then, the number of cases has grown exponentially and, despite recognized underreporting, the country ranked second in the world among countries with the highest number of cases and deaths due to COVID-19 [1, 2].

COVID-19 is a potentially severe acute respiratory infection caused by the novel coronavirus severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The clinical presentation is generally that of a respiratory infection with symptom severity ranging from a mild common cold-like illness to a severe viral pneumonia leading to acute respiratory distress syndrome that is potentially fatal. Characteristic symptoms include fever, cough, dyspnea, and loss of taste/smell, although some patients may be asymptomatic. Complications of severe disease include, but are not limited to, multi-organ failure, septic shock, and venous thromboembolism. Symptoms may be persistent and continue for more than 12 weeks in some patients. After the acute phase and especially following hospital discharge patients may present with muscular weakness, oxygen dependency requiring extra-hospital rehabilitation and, still, may need continuous care for complications such as infectious, thrombosis or wounds [3].

### 1.1 How did the pandemic affect Brazil?

The pandemic struck Brazil in an overwhelming way. The lack of effective preventive measures added up to a poor coordination by the various spheres of

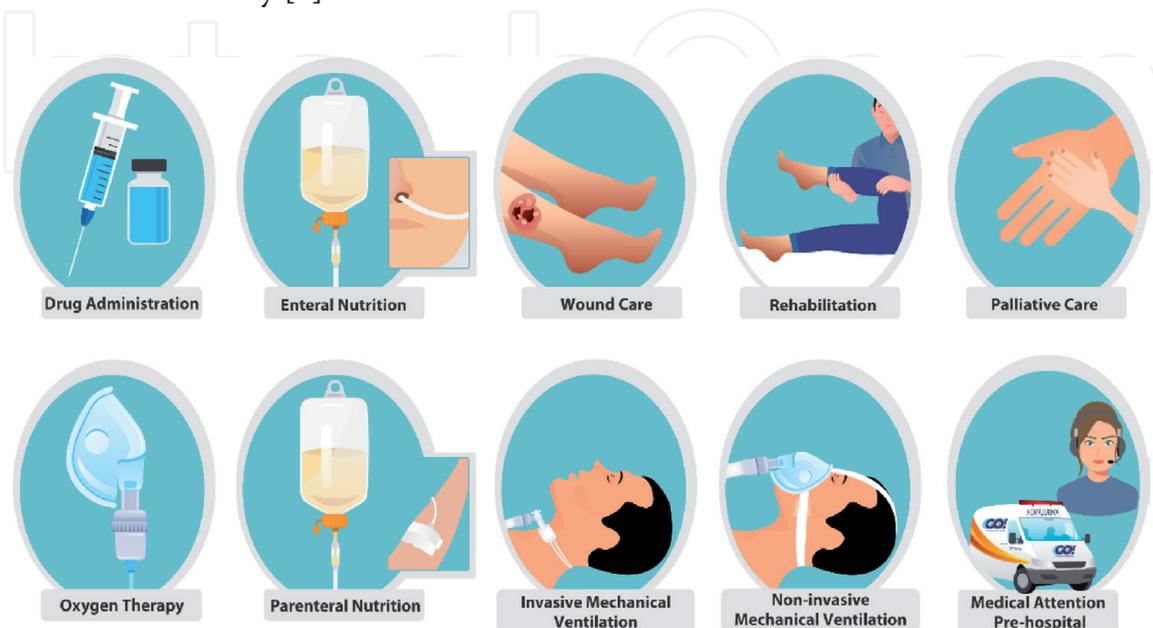
government, resulting in a favorable environment for viral transmission and the emergence of new variants. The explosion in the number of infections, reaching more than 15 million Brazilians infected, a number that is underestimated due to the low availability of diagnostic tests especially at the beginning of the pandemic, led to the largest health and hospital collapse in the country's history. The ICUs were filled in several states both in the public and private system and patients died while waiting in line for a hospital bed.

In 2021 the country faced, and still faces, a shortage of human resources in hospitals, a shortage of medications, and a severe crisis in the supply of medicinal oxygen.

## 1.2 How did the pandemic affect patients with comorbidities and those who are more dependent?

Advanced age and the presence of comorbidities are associated with increased mortality due to the new coronavirus. The high prevalence of this combination, associated with physical environments that provide inadequate barriers to infection control, place patients in long-term care facilities at greater risks. Studies show that once the first case in these institutions exists, the possibility to have the infection spread to other patients is quite high [4–6]. There are several reports worldwide about high mortality related to COVID-19 among residents of long-term care institutions (LTCI) with up to 2/3 of patients affected within a period of 3 weeks and mortality reaching levels as high as 72% [7]. Dr. Grabowski's [6] point of view highlights the elevated mortality rates due to COVID-19 among LTCI residents, representing 25% of the deaths from COVID-19 in the US. Percentages are even higher in some US states and European countries such as France and Ireland. The concern with the safety of patients and professionals at these facilities is extremely relevant and compels us to make a deeper reflection.

The HC sector has grown exponentially in the last few decades. Currently it is estimated that approximately one million patients/year from the public and private sectors use HC in Brazil, where much of post-acute care, rehabilitation, and long-term chronic patient care is provided at home. Data from 2019 revealed that the number of patients treated at home was equivalent to 5% of the number of hospital beds in our country [8].



**Figure 1.**  
*Most frequent therapies performed by home Care in Brazil.*

This modality of treatment includes drug administration, enteral nutrition, wound care, rehabilitation, oxygen therapy, respiratory support, and more complex therapies such as parenteral nutrition and invasive or non-invasive mechanical ventilation (**Figure 1**).

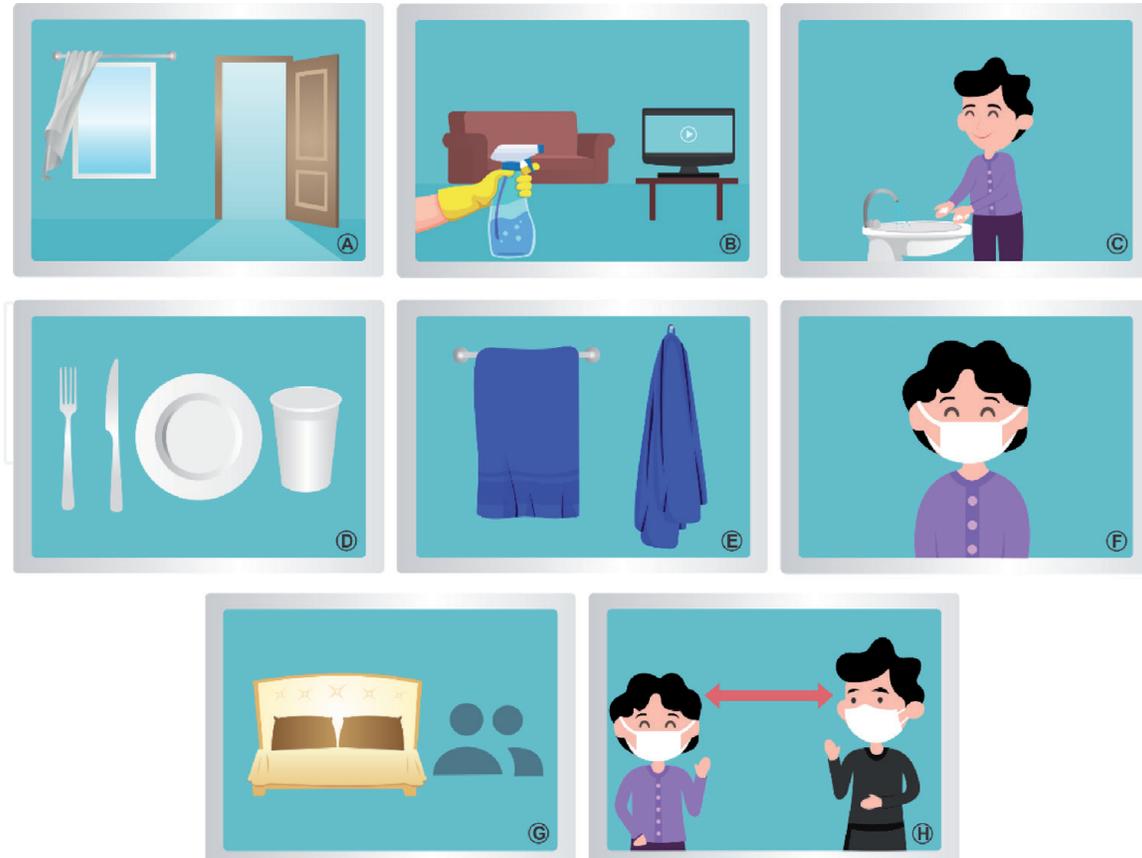
Home care is available in both public and private health sectors and has been distinguished by humanized care, the patient's reintegration into society, and low incidence of infections.

## 2. What did home care do differently in Brazil?

Home Care providers needed to take additional steps to keep patient care at home and to ensure a safe environment for patients and professionals. Each institution adopted targeted measures and Home Doctor, a private home care company, became a Brazilian reference on this topic. The main measures adopted were as follows:

### 2.1 Environment measures

With regard to the COVID-19 pandemic, patients in home care have an advantage. As they are naturally in isolation at home, it is possible for them to strictly follow the recommendations of keeping distance from other people, especially those with any suspicious symptoms while staying in a ventilated and clean environment with rigorous hand hygiene and the use of individualized materials (**Figure 2**).



**Figure 2.**  
Main environmental benefits: A - ventilated environment; B - environment cleaned with 70% alcohol; C - strict hand hygiene; D - individualized kitchenware; E - individualized hygiene utensils; F - face mask; G - private room; and H - social distancing.

Physically, the home environment is the best place to reduce the circulation and spread of the virus and patients in home care take advantage of this evident benefit.

## **2.2 Professionals and training**

Patients under home care are treated by a team of skilled professionals in a directed way in order to receive exactly the assistance needed by a qualified team trained in the use of personal protective equipment (PPE) with rational optimization of the number of home visits depending on the patient's clinical condition.

These professionals receive training on topics related to the pandemic so as to inform professionals regarding the recommended protocols, as well as to provide the emotional and psychological support necessary for caring in this critical scenario (**Figure 3**).

## **2.3 Personal protective equipment (PPE)**

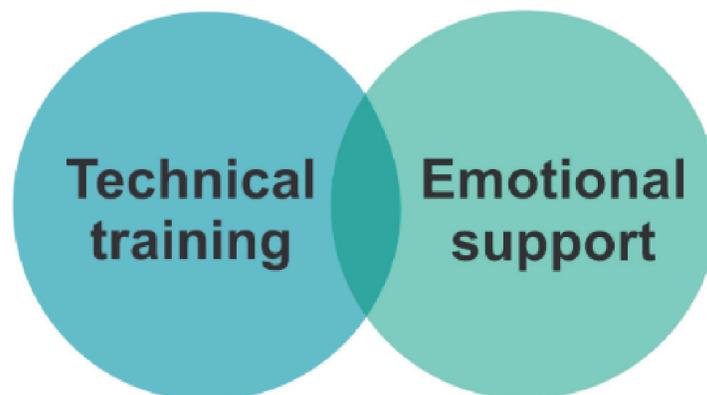
The professionals who work at home care services undergo periodical training about how to use PPE, regarding the criteria of indication, and in the techniques for putting on and taking off the PPE (**Figure 4**).

## **2.4 Telemedicine**

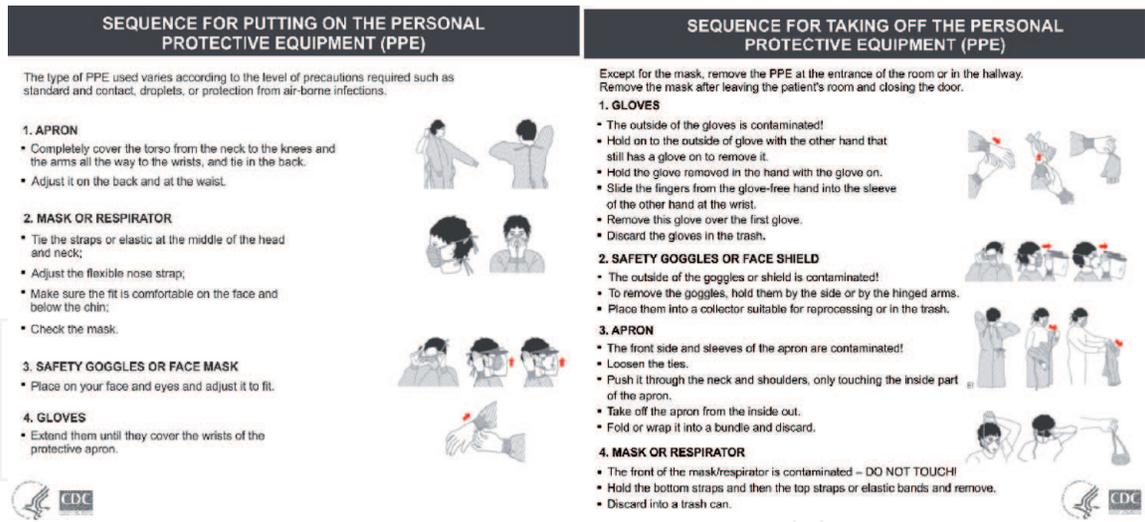
Telemedicine was regulated in Brazil on an emergency basis at the beginning of the pandemic. In this way, home care companies that were not structured for virtual care had to quickly prepare themselves, acquire secure telemedicine platforms, train their employees, guide patients and family members, and implement this resource in practice.

Virtual consultations have become routine for many professionals in order to reduce the flow of professionals in patient homes and the circulation of these professionals (**Figure 5**).

Telemedicine played an important role in home care during the pandemic in Brazil because it made it possible to replace regularly scheduled visits and to minimize the circulation of professionals in the patient homes. It also showed itself to be a valuable resource for more rigorous and close follow-up of patients with more complex clinical conditions and patients infected with COVID-19. The monitoring done by the physician using telemedicine enabled a faster decision-making process at the first sign of clinical decompensation, optimizing treatment, reaching a rational use of scarce ambulance resources, and ultimately providing a better care of the patient at home with reduced levels of hospitalization.



**Figure 3.**  
*Two training spheres.*



**Figure 4.**  
 Definition of PPE use and training protocol regarding putting on and taking off PPE.



**Figure 5.**  
 Teleconsultation.

	20/Apr (08h-09h)	19/Apr (20h-21h)	19/Apr (16h-17h)	19/Apr (12h-13h)
<b>Blood Pressure</b> (mmHg)	137/59	117/69	107/59	-
<b>Heart Rate</b> (bpm)	67	67	68	-
<b>Temperature</b> (°C)	36,4	36,0	-	-
<b>Glycemia</b> (mg/dL)	-	-	-	-
<b>Oximetry</b> (%)	94	96	98	94

**Figure 6.**  
 A COVID-19 patient remote monitoring (blood pressure, heart rate, temperature, glycemia, oxygen saturation).

## 2.5 Remote devices for monitoring

Vital signs such as blood pressure, heart rate, temperature, and pulse oximetry can be measured by the patient using Bluetooth wireless devices, which are transmitted in real time to a monitoring center (Figure 6).

Additionally, patients using mechanical ventilation may have their ventilation monitored remotely through equipment with this real-time transmission feature. This resource, which had already been utilized on a smaller scale for home care in Brazil, began to be used more widely during the pandemic. It allows real-time visualization of patient ventilation monitoring so that decompensations are quickly identified, allowing adjustments to be made in an agile manner, and consequently improving patient care and optimizing the deployment of resources to the home (Figure 7).

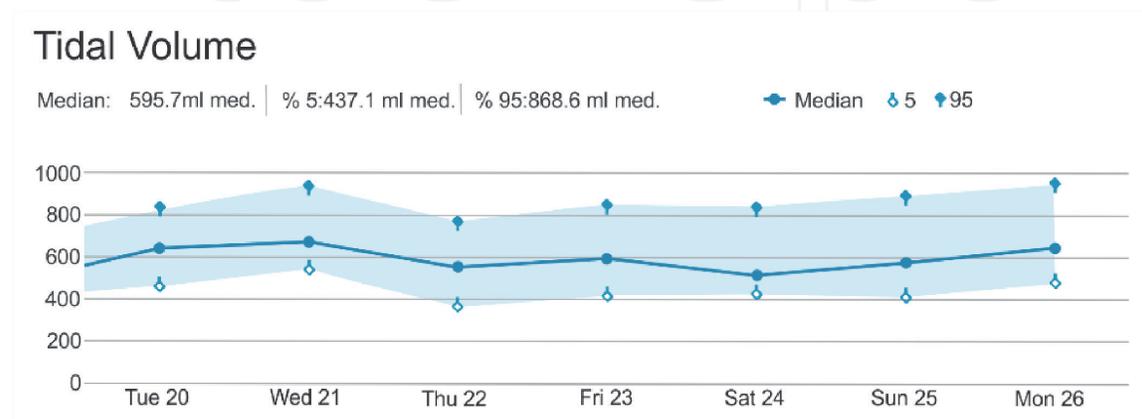
## 2.6 Use of oxygen concentrator

In Home Care, it is classically recommended to use oxygen concentrators instead of oxygen cylinders in order to reduce the risks related to the physical factors of explosion and of shortages due to delayed cylinder substitution. During the pandemic, the scarcity of oxygen and gas cylinders for recharging was intense in Brazil, but Home Care treatment managed to safely keep oxygen therapy in the homes due to having oxygen concentrators in most households. There was no need for hospitalization of patients because of lack of oxygen. All patients were able to be safely maintained under home oxygen therapy and, additionally, more patients under oxygen therapy could be transferred to home care, contributing to the availability of hospital beds for more severe patients (Figure 8).

## 2.7 What have been the results of home care during the COVID-19 pandemic?

During the first year of the pandemic (from March 2020 to March 2021), one of the largest home care providers in Brazil treated a total of 4,500 patients at home and registered only 179 confirmed cases of COVID-19 among patients who were already receiving home care during this period, 91 (50,8%) in women and 88 (49,2%) in men, with a mean age of 61.1 years [9]. COVID-19 had an incidence of 3.9% in the population studied, which is below the Brazilian incidence of 6%. There were 56 (31.2%) hospitalizations with 21 (11.7%) hospital deaths and 4 (2.2%) cases of home death, which represents a lethality of 13.9% (25 total cases of death). The number, clinical outcomes, and geographical distribution of the confirmed COVID-19 cases were reported daily to all healthcare teams through a case panel [10].

Apart from COVID-19, more than 2,500 patients per day were treated at home, which allowed hospital beds to be dedicated to critically COVID-19 patients and contributed to reduce total hospital occupancy.



**Figure 7.**

Image representing remote monitoring of the mechanical ventilation of a patient under home care.



**Figure 8.**  
*Oxygen concentrator.*

On the other hand, acute COVID-19 patients with mild and moderate symptoms were taken care of at their homes, and also patients in the recovery phase of the disease were admitted for rehabilitation after hospital discharge. During this 1-year period, 64 new patients with a diagnosis of mild or moderate COVID-19 were successfully treated at home and 123 post-COVID patients were admitted to home care after hospital discharge to receive rehabilitation therapy and treatment for complications.

Home care assumed an important role in avoiding hospitalization of non-critical, suspected, or confirmed cases of COVID-19 and in providing care to patients through home monitoring of oximetry, oxygen supplementation, home medical support, daily medical telephone monitoring, and the provision of a medical emergency center available daily round-the-clock.

### 3. Conclusion

Home care in Brazil has undergone a profound transformation as a result of the pandemic. Significant and rapid technological advances were needed and training of the team became crucial. This, associated with the physical benefits of distancing by staying at home, boosted home care, which played a key role in treating COVID-19 and non-Covid-19 patients during the pandemic, resulting in liberating hospital beds and contributing to the sustainability of the Brazilian Health System in this catastrophic health crisis.

COVID-19 infection data in home care patients obtained after a year of severe epidemic in Brazil demonstrate that home care is safe environment for patients and professionals with low incidence and lethality related to SARS-CoV-2.

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