

Article

Long-term care facilities for older people in Brazil and the COVID-19 pandemic: epidemiological data and preventive measures

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Abstract: The COVID-19 pandemic has been challenging for society, especially for those residing in long-term care facilities (LTCF). This study aimed to describe rates of infection, hospitalization, and death due to COVID-19 among older people and staff of LTCF in Minas Gerais (Brazil) and identify strategies to prevent and control the disease spread. This cross-sectional study was conducted with 164 LTCF (6,017 older people). Among the studied LTCF, 48.7% confirmed COVID-19 infection in older people, resulting in 39.6% hospitalization and 32.3% death among infected. Moreover, 68.9% of LTCF confirmed COVID-19 infection in the staff, with 7.3% hospitalization and 1.2% death. Preventive measures were identified and classified as organizational, infrastructure, hygiene items and personal protective equipment, and staff training against COVID-19. These measures showed strategies and barriers experienced in the daily routine of LTCF during the pandemic. LTCF in Brazil experienced challenges similar to observed worldwide. Results highlighted the importance of continuity and improvement of protective measures for older people in LTCF, especially in low- and middle-income countries.

Keywords: SARS-CoV-2; nursing home; mortality.

1. Introduction

The COVID-19 pandemic was declared a public health emergency of international concern and increased the need for immediate strategies to control infectious diseases and preserve life [1]. The high prevalence of pre-existing comorbidities in older people required attention in different contexts and countries [2, 3]. In Brazil, the life expectancy for people aged 65 years reduced by 0.9 years in 2020, similar to observed in 2012 [4].

The COVID-19 spread was worrying in long-term care facilities (LTCF), mainly because of the fragility of older people and the collective housing context composed of a staff with potential risk of exposition [5]. Comas-Herrera et al. [3] investigated information from 22 countries in Europe, Asia, Africa, America, and Oceania and verified that LTCF residents accounted for 41% of all deaths from COVID-19, reinforcing the need to support these institutions and protect older people. Moreover, COVID-19 transmission reached 60% in LTCF and increased the rate of death of this population [5]. Based on recommendations of the World Health Organization (WHO), the Brazilian Ministry of

Health and Social Development published technical notes reinforcing urgent measures to prevent and control the COVID-19 in LTCF [6].

Recent data identified 7,029 LTCF in Brazil, mainly in the southeast (60.2%) and south (26.7%) regions, compared with 3,548 LTCF in 2010 [7, 8]. However, Brazilian LTCF have insufficient governmental and financial support for the provision of older people and staff, impairing management and care [8]. Also, several Brazilian studies indicated scarcity and low methodological quality of data about Brazilian older people residing in LTCF [9-11].

Data regarding rates of infection, hospitalization, and death from COVID-19 and preventive measures from Brazilian LTCF are essential to identify possibilities and barriers to fighting against this pandemic. These data could also contribute to resolute and focused actions to overcome the main obstacles in the daily living of LTCF, even with lack of resources [12]. Thus, this study aimed to describe rates of infection, hospitalization, and death from COVID-19 among older people and staff of LTCF in Minas Gerais (Brazil) and identify strategies used to prevent and control this disease.

2. Materials and Methods

This is a cross-sectional study with a non-probability sampling composed of LTCF from Minas Gerais state, Brazil. Brazil comprises 26 states and the Federal District and has over 200 million inhabitants. Minas Gerais has the fourth-largest area, is the second most populous state (21 million), and has the third-largest gross domestic product of the country (human development index of 0.731) [13].

We identified 1,116 LTCF in Minas Gerais (distributed in 10 regions), mainly in the central region (38.4%), according to data from the Public Ministry of Minas Gerais, the State Secretariat for Social Development, and the National Front for the Strengthening of LTCF. Of those identified, 911 had a telephone number or e-mail and were invited to participate in the study. To ensure a high response rate, all institutions were invited to participate via e-mail. Then, we contacted institutions three times via telephone. After three unsuccessful attempts, a new round of e-mails was performed. Invitations were also published on websites and social networks of the Public Ministry of Minas Gerais and the National Front for the Strengthening of LTCF.

Authors elaborated a self-applicable electronic questionnaire (Google Form) based on recommendations and technical notes from the Federal Government about the context of LTCF and applied to technicians, managers, owners, and professionals working with assistance and administration of these facilities between January 4th and July 1st, 2021. The questionnaire included 55 items, divided into three sections: 1) identification and characterization of the institution and respondent; 2) prevalence of COVID-19 cases, hospitalization, and deaths in older people and staff; and 3) preventive measures adopted to fight against COVID-19, including organizational measures adopted by institutions, infrastructure of institutions, availability of personal protective equipment (PPE) and hygiene items, and training of employees.

Data were transferred to a Microsoft Office Excel spreadsheet (Excel®, Redmond, WA, USA), version 10.0, and analyzed using the SPSS software (IBM Corp., Chicago, IL, USA), version 21.0. Data were presented as absolute and relative frequency.

The study followed the Resolution 466/12 of the National Health Council and the Declaration of Helsinki and was approved by the research ethics committee of the Pontifical Catholic University of Minas Gerais (no. 4,427,965/2020).

3. Results

A total of 164 LTCF (6,017 older people) participated in the study, indicating a response rate of 18%. However, we achieved a good representation of the population when observing the proportion of LTCF in Minas Gerais according to geographical

distribution by planning region (Table 1). From these LTCF, 120 were philanthropic (72.2%) and 44 were private (27.8%).

The number of available vacancies was 7,108, indicating an occupancy rate of 84.6% during the study. In addition, 37.2% (n=61) of LTCF were from the central region of Minas Gerais.

Results were divided into two sections: 1) prevalence of COVID-19 cases, hospitalizations, and deaths among older people and staff of LTCF; 2) preventive measures adopted by LTCF to fight the pandemic.

Table 1. Description of LTCF by planning region in the state of Minas Gerais and comparison with total LTCF of the state.

Planning regions - MG	Number of LTCF participating in the study	% per region	Total number of LTCF	% per region
Central	61	37.2%	449	40%
South	25	15.2%	172	15%
Mata	22	13.4%	135	12%
Midwest	13	7.9%	81	7%
Jequitinhona/Mucuri	12	7.3%	42	4%
Alto Paranaíba	7	4.3%	37	3%
Rio Doce	7	4.3%	56	5%
North	7	4.3%	39	4%
Triângulo	6	3.76%	87	8%
Northwest	4	2.4%	19	2%
Total	164	100.0%	1116	100%

MG: Minas Gerais; LTCF: Long-term care facility.

3.1. Prevalence of COVID-19 cases, hospitalizations, and deaths among older people and staff of LTCF

A total of 48.7% (n = 80) of LTCF had older people infected by COVID-19. Among 6,017 older people in LTCF, 1,139 were infected, indicating a COVID-19 prevalence of 18.9%. Older people were hospitalized in 39.6% (n = 65) of LTCF, and hospitalization rate was 34.8% among those with COVID-19 infection. In total, 214 older people from 32.3% (n = 53) of the studied LTCF died from COVID-19, indicating a lethality rate (death of infected people) of 18.8%. The mortality rate (death of the population) from COVID-19 among older people in LTCF was 3.6%. The rate of cases, hospitalizations, and deaths from COVID-19 among participants are shown in Figure 1.

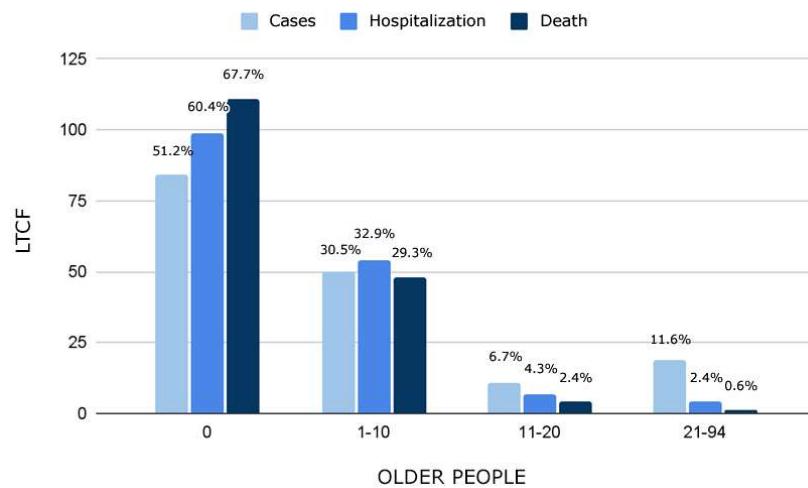


Figure 1. Rate of COVID-19 cases, hospitalizations, and deaths among older people in long-term care facilities (LTCF) of Minas Gerais, Brazil.

From the studied LTCF, 68.9% ($n = 113$) had COVID-19 cases among the staff, totaling 664 infected people. The staff was hospitalized in 7.3% of LTCF ($n = 12$), and hospitalization rate was 2.6% among those with COVID-19 infection. Death among staff workers was reported in 1.2% ($n = 2$) of LTCF, indicating a 0.3% lethality rate. The rate of cases, hospitalizations, and deaths from COVID-19 among the staff of LTCF are shown in Figure 2.

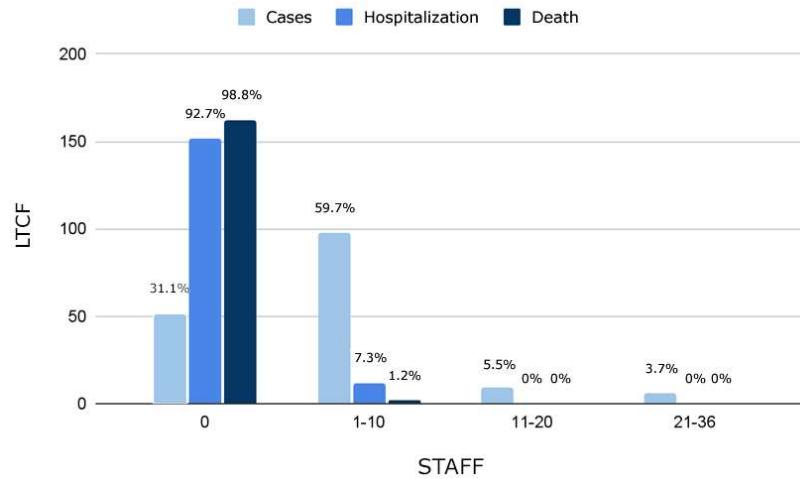


Figure 2. Number of cases, hospitalizations, and deaths among the staff of long-term care facilities (LTCF) and number of LTCF. COVID-19 was not registered in 31% of the LTCF and 1.2% had between 1 and 10 deaths.

3.2. Preventive measures adopted by LTCF to fight the pandemic

Preventive measures were divided into organizational, infrastructure, hygiene items and PPE, and staff training against COVID-19.

3.2.1. Organizational measures

A total of 96.9% ($n = 159$) of managers from LTCF claimed an action plan to prevent and control the COVID-19. However, almost 25% ($n = 37$) of LTCF did not have a contingency plan with the municipal health authorities to manage older people with suspected or confirmed COVID-19 infection.

Most LTCF (98.2%, n = 161) increased the frequency of cleaning and disinfection of surfaces and furniture, and 1.8% (n = 3) reported that adequate cleaning and disinfection were not possible. In addition, 97% (n = 159) of LTCF reported cleaning or quarantine procedures for packaging food, vegetables, and fruits.

As a measure of disease control, 82.3% (n = 135) of LTCF offered COVID-19 testing for all staff and older people at least once. Active screening of signs and symptoms of COVID-19 was also conducted in professionals and providers who accessed 92.1% (n = 151) of LTCF.

Visits from family members and friends were suspended in 95.7% (n = 157) of LTCF, and 89.6% (n = 147) also suspended collective socialization activities among older people.

Most LTCF (84.8%, n = 139) performed in-person medical consultations for suspected cases of COVID-19, and 94.5% reported positive cases to the Epidemiological Surveillance of the Brazilian Unified Health System, the Public Ministry, Social Assistance Secretariat, Elderly Rights Council, and other authorities.

Some older people from 4.3% (n = 7) of LTCF were not registered in the reference Basic Health Unit and presented an outdated vaccination schedule according to recommendations of the National Immunization Program.

3.2.2. Infrastructure measures

A total of 59.1% (n = 67) and 55.5% (n = 73) of LTCF did not use collective living spaces and drinking fountains, respectively; all LTCF maintained the highest ventilation flow in environments.

A specific entrance area for professionals, staff, and providers was available in 78.7% (n = 129) of LTCF. Most (85.4%, n = 140) had a place to isolate suspected and confirmed cases of COVID-19; however, 17.3% (n = 24) of these isolation places did not have a bathroom.

3.2.3. Hygiene items and PPE

Not all participating institutions had all the recommended PPE to protect against COVID-19 (i.e., surgical, N95/PFF2, and fabric masks; disposable gloves; disposable apron; boots; shoe covers; face shield; safety goggles; and surgical cap). Several LTCF managers reported lack of PPE for routine needs, such as N95/PFF2 masks (42%, n = 69) and safety goggles (44.5%, n = 73) (Figure 3).

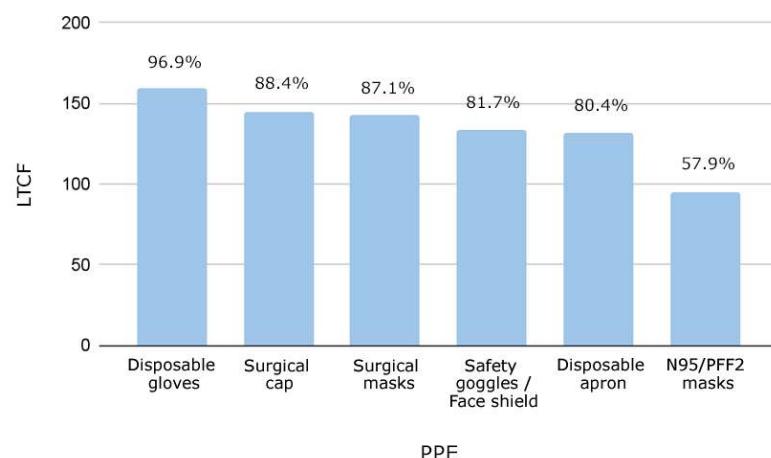


Figure 3. Personal protective equipment (PPE) available in long-term care facilities (LTCF) and number of LTCF.

Over 150 LTCF (96.9%) had disposable gloves, and 100 (57.9%) had N95/PFF2 masks. Moreover, 98% (n = 161) of LTCF provided 70% alcohol for hand hygiene of older people, and 99.4% (n = 163) for the staff. The availability of other hygiene items is shown in Figure 4.

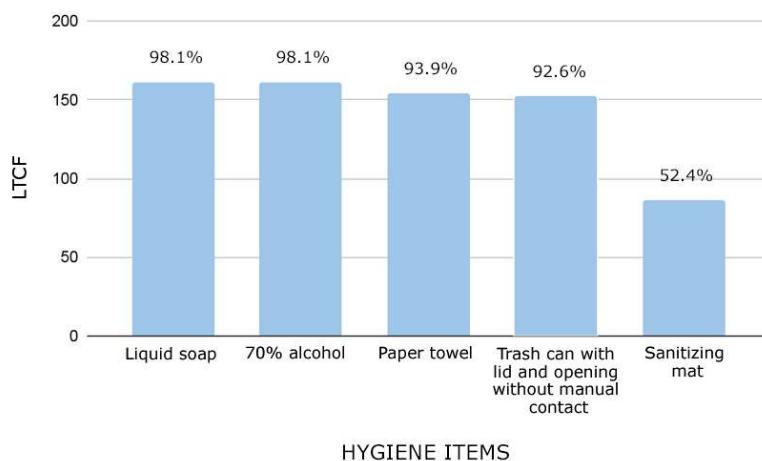


Figure 4. Hygiene items available in long-term care facilities (LTCF) and number of LTCF. More than 150 LTCF (98.1%) had liquid soap, and 85 (52.4%) had a sanitizing mat.

3.2.4. Staff training against COVID-19

From the studied LTCF, 79.9% (n = 131) received guidance to manage suspected or confirmed COVID-19 cases. Most professionals (97%, n = 159) trained hand hygiene techniques, proper use of PPE, and maintenance of social distancing. Moreover, training of LTCF was performed monthly (61%, n = 100), fortnightly (7.3%, n = 12), weekly (18.3%, n = 30), or daily (13.4%, n = 22).

LTCF provided posters, booklets, and verbal guidance about the correct techniques to older people, the importance of frequent hand hygiene (94.5%), respiratory etiquette (96.3%), and help of the staff with difficulties to perform hand hygiene (98.2%). Professionals, providers, and people from delivery services were instructed regarding hand hygiene with soap and water or alcohol before entering all LTCF.

4. Discussion

This study presented data regarding rates of COVID-19 infection, hospitalization, and death of older people and staff of LTCF in Minas Gerais (Brazil) and the main preventive measures adopted. Although electronic questionnaires are advantageous, they commonly achieve low response rates from participants [14]. For instance, studies from China [15] and Ireland [16] showed 48% and 62.2% of LTCF adherence, respectively. In contrast, Kariya et al. [17] identified a low response rate (16.9%) of questionnaires regarding infection prevention and control measures among LTCF. Daily problems among older people and staff during the pandemic may have also contributed to the low availability of participants [15, 16]. Furthermore, cut-off points for response rates are not recommended in rapidly developing scenarios, such as the one experienced during the COVID-19 pandemic, since studies with small samples may also contain important findings to direct further research [18].

A high variability of COVID-19 cases was observed among older people in LTCF worldwide (4% to 77%, mean prevalence of 37%) [19]. Wachholz et al. [20] identified an incidence of 6.57% of COVID-19 cases in 2,154 Brazilian LTCF (n = 59,878 older people). In the present study, 48.8% (n = 80) of LTCF had COVID-19 cases among older people, which is lower than in developed countries [3]. Research from Italy (57 LTCF) and Ireland

(28 LTCF) showed COVID-19 cases in 64.9% and 75% of the sample, respectively [16, 21]. Nevertheless, some factors may have influenced our findings, such as a low testing rate and high underreporting rates [11]. In the United States, a reduced number of COVID-19 cases (31.4% of studied LTCF) was observed among 9,395 LTCF from 30 states [22].

Older people were hospitalized due to COVID-19 in 34.8% of the studied LTCF, reinforcing the fragility of this population. During the study, the hospitalization rate due to COVID-19 was almost four-fold higher (34.8%) for older people in LTCF than for the general population (8.8%) from Minas Gerais [23].

The present study reported a lower lethality rate of COVID-19 in LTCF of Minas Gerais (Brazil) than in Australia (33.1%), Ireland (27.6%), and Canada (27.8%) [16, 24, 25]. At least 40% of all COVID-19 deaths in the United States were from older people in LTCF [26]. Wachholz et al. [20] showed a mortality and lethality rate of approximately 1.47% and 22.44%, respectively, among older people in LTCF in Brazil due to COVID-19; the mortality rate was 1.15% in Minas Gerais.

Based on information from 12 countries up to April 2020, a total of 107,528 deaths due to COVID-19 were estimated in Brazilian LTCF [27]. In Minas Gerais, the estimated number of deaths was 12,093 [27]. Applying the same projections to the present study, which evaluated about 15% of LTCF in Minas Gerais, the total number of deaths of older people would be 1,456, lower than Machado et al. [27]. However, authors highlighted that the estimated number of deaths could change if preventive measures were adopted to mitigate the impact of COVID-19 on LTCF [27].

Contamination of the staff is a substantial risk to older people in LTCF [5]. The high prevalence of COVID-19 among the staff could be explained by the transit in other environments (e.g. hospitals, other facilities, and public transport) [5]. Although health professionals were asymptomatic [19, 28], few LTCF presented hospitalization and death cases, reinforcing the low vulnerability of this public due to a reduced number of risk factors.

The Ministry of Health published the National Contingency Plan for the Care of Institutionalized Older People in the COVID-19 pandemic in April 2020, which included guidelines for prevention, support, and health recovery of institutionalized older people during the pandemic [5, 11]. Approximately 77.5% of LTCF in this study did not develop this plan with health authorities. In contrast, 96.9% of LTCF had an internal institutional plan that considered individualities.

In-person visits by the socio-family network and collective activities occurred in some LTCF, exposing older people to risk since social distancing is essential to control Sars-Cov-2 transmission [5]. In this context, the Ministry of Health and the Brazilian Society of Geriatrics and Gerontology recommended suspending in-person visits to LTCF to avoid contact and reduce disease transmission between older people and infected people [6, 29].

Active screening (i.e., monitoring of signs and symptoms of COVID-19 in older people, professionals, and visitors) allows early detection and isolation of suspected and confirmed cases in LTCF [30] and is essential for an effective control of COVID-19 [31, 32]. Most LTCF offered testing for all older people and staff at least once during the pandemic. Immediate notification to epidemiological surveillance bodies is also needed in suspected cases (i.e., symptoms of influenza or severe acute respiratory syndrome) to improve protection measures and perform adequate strategies against the virus [6]. In the present study, LTCF notified COVID-19 cases to the Epidemiological Surveillance of SUS, contributing to monitoring of virus transmission and health situation of this population.

Strategies to prevent COVID-19 are disseminated internationally; however, specific knowledge and training of teams are needed due to peculiarities of each location. In Minas Gerais, 20.1% of the studied LTCF did not train the staff to manage suspected and confirmed cases of COVID-19. According to the Ministry of Health, LTCF are also responsible for training professionals to prevent and control COVID-19 transmission [5]. Most staff from LTCF (97%) received training only to prevent COVID-19 transmission, including the

correct and safe use of PPE [1]. Furthermore, most training actions were conducted online in Brazil, especially by the organized civil society [33]. Nevertheless, considering that most populations have low socioeconomic and educational levels, dissemination of this information may have been insufficient [10]. Older people in LTCF present different dependence levels, which may also impair self-care and the use of preventive measures against COVID-19 [34]. Thus, the staff must protect older people and ensure preventive measures [6].

Considering that COVID-19 spreads through respiratory droplets, drinking fountains should be used only with disposable cups to avoid contact with the mouth [6]. Almost half of LTCF from the present study used collective drinking fountains, and 40.8% used living spaces with shared objects. Most LTCF guided the correct hand hygiene and respiratory etiquette, preventing the virus spread and contamination of older people. Ventilation of environments was also improved in all studied LTCF since they reduce the risk of COVID-19 spread [6].

The WHO advises cleaning and disinfecting surfaces during the pandemic to eliminate pathogens, reduce the viral load in contaminated areas, and prevent COVID-19 infection [14, 30]. Most LTCF increased the daily cleaning routine and disinfection of surfaces and furniture. Hygiene of packaging and food was previously recommended, gained importance during the pandemic, and must be maintained to prevent other infectious diseases. However, most LTCF did not have a specific entrance area for professionals and employees, increasing the risk of contact with the living area of older people. Although most managers of LTCF (85.4%) reported having isolated places for suspected and confirmed cases of COVID-19, 17.3% did not have a bathroom in this place. The lack of infrastructure observed in LTCF impairs COVID-19 prevention [11] and highlights the need for infrastructure strategies to protect older people in possible situations of viral contamination.

Dykgraaf et al. [35] identified the following potential strategies to prevent or mitigate COVID-19 transmission in LTCF: serial testing of older people and staff; staff confinement with residents in LTCF; digital and telehealth training; restriction of visits; environmental ventilation; intersectoral collaboration; and staff training. In contrast, routine temperature measurement without other diagnostic tools, symptom-based testing, or tracking the prevalence after case identification were possibly ineffective [35]. Authors also reinforced that preventive measures should be offered for most vulnerable people [35], even with a worldwide vaccination program prioritizing older people in LTCF. The findings of Dykgraaf et al. [35] were reinforced by a review published in 2021 [36], suggesting that non-pharmacological measures implemented in LTCF could prevent COVID-19 infection and its consequences. Considering the high morbidity and mortality among older people and the low methodological quality of studies in this review [36], measures identified as potentially effective are probably the best option, at least until satisfactory immunization rates are reached.

PPE is also essential to protect older people and the staff, and LTCF must ensure its availability since lack of PPE fails to prevent COVID-19 [19, 28]. The studied LTCF from Minas Gerais showed a lack of PPE, such as N95/PFF2 masks and goggles. These findings corroborated studies from the United States, in which 72% of the 9,395 studied LTCF had insufficient PPE (88% had lack of face shields and 64% lack of surgical mask) [22], and other locations [10, 37, 38]. Similarly, a Chinese study conducted with 484 LTCF showed a lack of PPE in 72% of the sample [15]. These results may reflect the ineffectiveness of public policies for LTCF from several countries [39]. Thus, efforts are needed to acquire PPE for the LTCF staff since they can be asymptomatic carriers of COVID-19 [19, 28].

Authors from several countries also highlighted these challenges. Wachholz et al. [12] analyzed information from 23 managers of LTCF in Hispanic American countries during the COVID-19 pandemic and showed obstacles similar to those found in our study (e.g., difficulty to develop a strategic plan to manage cases and deaths, acquire PPE, and test for SARS-CoV-2). Therefore, these multiple needs require a coordinated response between

managers and the government [40]. Based on the present data, the scenario experienced in LTCF from Minas Gerais at the beginning of the pandemic was better than LTCF worldwide, especially concerning COVID-19 lethality among older people [3]. The civil society was mobilized even without an effective public policy to protect LTCF [33], which possibly helped minimize the negative impacts of COVID-19 (i.e., number of cases, hospitalizations, and deaths). This mobilization began with the “screaming for LTCF – Urgent – COVID-19” [41], which led to a public hearing in the National Congress on April 7, 2020. Because of this, the National Front for the Strengthening of LTCF united hundreds of professionals and volunteers across Brazil to mitigate the effects of the COVID-19 pandemic on LTCF [42]. Authors from the field of aging and public management also proposed policies (e.g., CIAT: coordination, identification, assessment, and work) to support government actions against the pandemic and manage the impacts of COVID-19 effects in LTCF of developing countries [43].

Vaccines against COVID-19 were not available in Brazil at the time of elaboration of the questionnaire for the present study. We also highlight that rates of infection, hospitalization, and death observed among older people and staff may have impacted vaccination, which coincided with the data collection period. Nevertheless, this study is not free of limitations. The growing demand for research on this topic, lack of time due to workload, and cultural habits may have contributed to a lower response rate than international studies [15, 16]. Furthermore, the number of people working in LTCF was not collected, which hindered the determination of COVID-19 prevalence and mortality rate among the staff.

5. Conclusions

The COVID-19 widely affected LTCF, highlighting the need for civil and governmental actions due to the vulnerability of older people. We showed a COVID-19 prevalence in older people and staff from LTCF of Minas Gerais (Brazil). Moreover, COVID-19 lethality was higher in older people than in the staff. Prevention strategies, especially infrastructure measures and availability of PPE, could prevent the contamination of older people and the staff; however, many LTCF could not adopt some of these recommendations.

Barriers to fighting against COVID-19 were also identified in LTCF, justifying the need for actions focused on daily obstacles and encouragement of public policies. The results emphasize the continuity and improvement of actions to protect older people and promote health education with managers, professionals, and residents of LTCF. Further studies are needed to monitor the impacts and challenges of the COVID-19 pandemic.

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Informed Consent Statement: Informed consent was obtained from all individuals involved in the study.

Data Availability Statement: Data presented in this study are available upon request to the correspondent author. Data is not publicly available due to privacy concerns.

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