









COVID-19 morbimortality in long-term care facilities in the state of Bahia, Brazil

Morbimortalidade por COVID-19 em instituições de longa permanência para idosos na Bahia, Brasil

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ABSTRACT

OBJECTIVE: To describe coronavirus disease 2019 (COVID-19) morbidity and mortality in long-term care facilities (LTCFs) in the state of Bahia, Brazil. **METHODS:** This is an ecological study involving identified and active LTCFs in Bahia, monitored by the Intersectoral Monitoring Commission of LTCFs. Data analysis included COVID-19 incidence among older residents and workers and COVID-19 hospitalization, fatality, and mortality rates among older residents. In addition to a global analysis of data from Bahia, a stratified analysis compared (i) the East macroregion with the rest of Bahia, and (ii) private LTCFs with philanthropic ones. **RESULTS:** Our sample consisted of 175 LTCFs, more than half located in the East macroregion ($n = 99$). Most facilities declared themselves as philanthropic ($n = 94$) or private ($n = 59$). From April/2020 to June/2021, COVID-19 incidence was 30.71% among residents and 19.86% among LTCF workers. Considering older residents, mortality was 3.57% and fatality was 11.63%. Incidence was lower in the East macroregion, for older residents (relative risk [RR] = 0.77; 95% confidence interval [CI] 0.68–0.87) and LTCF workers (RR = 0.70; 95%CI 0.59–0.83). The hospitalization rate due to COVID-19 was 19.97%, being higher in private LTCFs (RR = 1.61; 95%CI 1.30–2.00). **CONCLUSIONS:** This study reveals that COVID-19 morbidity and mortality in LTCFs in Bahia were consistent with the wide ranges described in the literature, although case fatality was lower than expected. This demonstrates the importance of strategies to coordinate, identify, assess, and target support for LTCFs, highlighting the need for stronger public policies.

KEYWORDS: COVID-19; long-term care; morbidity; mortality.

RESUMO

OBJETIVO: Descrever a morbimortalidade da COVID-19 em instituições de longa permanência para idosos (ILPI) no estado da Bahia, Brasil. **METODOLOGIA:** Este é um estudo ecológico que envolve ILPI identificadas e ativas na Bahia, monitoradas pela Comissão Intersetorial de Monitoramento das ILPI. A análise dos dados incluiu a incidência de COVID-19 entre residentes e trabalhadores e as taxas de hospitalização, letalidade e mortalidade decorrentes de COVID-19 entre residentes. Além da análise global dos dados do estado, uma análise estratificada comparou (i) a macrorregião Leste com o restante da Bahia e (ii) ILPI privadas com filantrópicas. **RESULTADOS:** Nossa amostra incluiu 175 ILPI, mais da metade localizada na macrorregião Leste ($n = 99$). A maioria declarou-se como filantrópica ($n = 94$) ou privada ($n = 59$). De abril de 2020 a junho de 2021, a incidência de COVID-19 foi de 30,71% entre residentes e de 19,86% entre trabalhadores. A mortalidade entre idosos residentes foi de 3,57% e a letalidade foi de 11,63%. A incidência foi menor na macrorregião Leste, para idosos residentes (risco relativo — RR = 0,77; intervalo de confiança — IC95% 0,68–0,87) e trabalhadores (RR = 0,70; IC95% 0,59–0,83). A taxa de hospitalização por COVID-19 foi de 19,97%, sendo maior em ILPI privadas (RR = 1,61; IC95% 1,30–2,00). **CONCLUSÕES:** Este estudo revela que a morbimortalidade da COVID-19 em ILPI da Bahia foi consistente com as amplas faixas descritas pela literatura, ainda que a letalidade tenha sido menor que o esperado. Isso demonstra a importância de estratégias para coordenar, identificar, avaliar e direcionar o suporte a ILPI, ressaltando-se a necessidade de políticas públicas mais fortes para esse setor. **PALAVRAS-CHAVE:** COVID-19; cuidados de longa duração; morbidade; mortalidade.

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INTRODUCTION

While entire populations have suffered impacts of the coronavirus disease 2019 (COVID-19) pandemic, some groups are at higher risk, particularly older people.^{1,2} Data from the United States of America (USA) revealed that 45% of hospitalizations, 53% of admissions to intensive care units, and 80% of deaths from COVID-19 occurred in people aged 65 or over, who correspond to only 17% of its total population.² This is attributed to immunosenescence and comorbidities such as hypertension, diabetes, and chronic kidney disease, which are associated to a greater incidence of unfavorable outcomes of COVID-19.^{1,2}

Long-term care facilities (LTCFs) concentrate high-risk populations (frail, oldest old, and with chronic diseases) that were especially affected by the pandemic. In Canada, Ireland and France, mortality from COVID-19 in LTCFs corresponded to more than half of the total mortality since the beginning of the pandemic until June 2020.³ Viral transmission rates among LTCF populations appear to be higher than those in general populations due to frequent close contacts during daily activities and the higher vulnerability of their residents.

In Brazil, as in other low- and middle-income countries (LMICs), the lack of adequate structure and human resources in LTCFs can hinder the adoption of control measures against infectious diseases.^{4,5} During the COVID-19 pandemic, some organizations have been created to protect LTCF residents in Brazil. These include the National Front to Strengthen Long-Term Care Facilities for Older Adults⁶ and the Intersectoral Monitoring Commission of LTCFs in the state of Bahia.⁷ This Commission has implemented actions to coordinate, identify, assess, and target their support, in line with the CIAT framework, towards an emergency strategy for managing COVID-19 in LTCFs.^{8,9} This included the elaboration, for the first time ever, of a single list of LTCFs in Bahia.

The aim of the present study is to describe COVID-19 morbidity and mortality in LTCFs in the state of Bahia, Brazil.

METHODS

This is an ecological study approved by the National Research Ethics Commission (opinion No. 4 506 012, January 21, 2021), using secondary data collected by the Intersectoral Monitoring Commission of LTCFs in the state of Bahia, which provided consent for the use of these data. This commission identified all LTCFs in Bahia, creating a single list, and performed telephone-based disease surveillance every 72 hours to check for suspected COVID-19 cases and every 24 hours to follow up symptomatic and/or confirmed COVID-19 cases in all facilities.

A total of 210 active LTCFs were identified in Bahia between April 2020 and March 2021, all of which were invited to take part in a survey conducted between April and June 2021. There were 33 non-responses, and 2 facilities were excluded because the number of people aged under 60 exceeded those aged 60 or over.

Variables of interest were: LTCF location (health care macroregion), LTCF funding type, number of older residents, number of bedridden residents, number of workers, and aggregated information on COVID-19 morbidity and mortality (number of COVID-19 cases confirmed by clinical assessment + RT-PCR in older residents and workers; number of hospitalizations of older residents due to COVID-19; and the number of deaths of residents and workers due to COVID-19).

Data analysis was performed with reference to the following indicators: median number of older residents and employees per LTCF, percentage of bedridden residents, COVID-19 incidence rate in older residents and workers; COVID-19 hospitalization rate (= number of hospitalizations of older residents due to COVID-19/number of confirmed COVID-19 cases), as well as fatality (= number of deaths due to COVID-19/number of confirmed COVID-19 cases), and mortality (= number of deaths due to COVID-19/number of older residents) rates in older residents. In addition to a global analysis of data from the state of Bahia, a stratified analysis compared (i) the East macroregion (the most populous of the 9 macroregions and seat of the state capital) with the rest of Bahia, and (ii) LTCFs with different self-declared sources of funding (private and philanthropic). Associations between categorical variables were verified by prevalence ratios (in relation to the prevalence of bedridden residents) and relative risk (concerning incidence, mortality, and fatality rates), with a 95% confidence interval (CI).

RESULTS

Our sample consisted of 175 LTCFs, more than half of which were in the East macroregion ($n = 99$). The sample covers 4647 older residents and 3298 workers (median = 26.55 older residents and 18.85 workers per LTCF). Between April 2020 and June 2021, 1427 COVID-19 cases were confirmed among older residents and 655 cases were confirmed among LTCF workers (incidence rates: 30.71% and 19.86%, respectively). When compared to the rest of Bahia, the East macroregion had a lower COVID-19 incidence, both for older residents (RR = 0.77; 95%CI 0.68–0.87) and LTCF workers (RR = 0.70; 95%CI 0.59–0.83). Approximately 19.97% of all COVID-19 cases in older residents required hospitalization, with a higher percentage in the East macroregion (RR = 1.49; 95%CI 1.21–1.85). A total

of 166 COVID-19 deaths of older residents were registered, corresponding to a mortality of 3.57% and a fatality of 11.63%, without significant difference between the 2 studied regions (Table 1). Furthermore, there were 531 non-COVID deaths of older residents (mortality rate = 11.43%). Two COVID-19 deaths of LTCF workers were reported.

Most facilities declared themselves as philanthropic ($n = 94$) or private ($n = 59$) institutions. Others declared themselves as public ($n = 8$) or with mixed funding ($n = 9$), while some were operated by religious orders ($n = 5$). While in the East macroregion there was a slight predominance of private

LTCFs over philanthropic institutions (48 vs 42), in the rest of the state, private LTCFs were the minority (11 vs 52). The prevalence of bedridden patients was lower in private LTCFs (18.88%) than in philanthropic ones (21.59%), but this difference did not reach statistical significance (prevalence ratio [PR] = 0.87; 95%CI 0.76–1.00). The hospitalization rate of older people due to COVID-19 was higher in private LTCFs (RR = 1.61; 95%CI 1.30–2.00). There were no other significant differences in morbimortality due to COVID-19 between private and philanthropic LTCFs in the state of Bahia (Table 2).

Table 1. COVID-19 morbidity and mortality in LTCFs in the East macroregion and the rest of the state of Bahia

	Total (n = 175)	East macroregion (n = 99)	Rest of the state (n = 76)	RR	95%CI
Total number of LTCF residents	4647	2474	2173	NA	NA
Total number of LTCF workers	3298	1932	1366	NA	NA
COVID-19 cases among older residents	1427	694	733	NA	NA
Hospitalizations of older residents due to COVID-19	285	167	118	NA	NA
Deaths of older residents due to COVID-19	166	82	84	NA	NA
COVID-19 cases among LTCF workers	655	338	317	NA	NA
COVID-19 incidence rate among older residents	30.71%	28.05%	33.73%	0.77	0.68–0.87
COVID-19 incidence rate among LTCF workers	19.86%	17.49%	23.21%	0.70	0.59–0.83
COVID-19 hospitalization rate among older residents	19.97%	24.06%	16.10%	1.49	1.21–1.85
COVID-19 fatality rate among older residents	11.63%	11.82%	11.46%	1.03	0.77–1.37
COVID-19 mortality rate among older residents	3.57%	3.31%	3.87%	0.86	0.63–1.16

COVID-19: coronavirus disease 2019; RR: relative risk; CI: confidence interval; LTCFs: long-term care facilities; NA: not applicable.

Table 2. COVID-19 morbidity and mortality in private and philanthropic LTCFs in the state of Bahia

	Private (n = 55)	Philanthropic (n = 94)	RR	95%CI
Total number of LTCF residents	1096	2834	NA	NA
Prevalence of bedridden residents	18.88%	21.59%	0.87*	0.76–1.00
Total number of LTCF workers	806	1691	NA	NA
COVID-19 cases among older residents	328	817	NA	NA
Hospitalizations of older residents due to COVID-19	100	154	NA	NA
Deaths of older residents due to COVID-19	43	80	NA	NA
COVID-19 cases among LTCF workers	155	357	NA	NA
COVID-19 incidence rate among older residents	29.93%	28.83%	1.03	0.93–1.16
COVID-19 incidence rate among LTCFs workers	19.23%	21.11%	0.91	0.77–1.08
COVID-19 hospitalization rate among older residents	30.49%	18.85%	1.61	1.30–2.00
COVID-19 fatality rate among older residents	13.11%	9.79%	1.34	0.95–1.90
COVID-19 mortality rate among older residents	3.92%	2.82%	1.39	0.97–2.00

COVID-19: coronavirus disease 2019; RR: relative risk; CI: confidence interval; LTCFs: long-term care facilities; NA: not applicable; *prevalence ratio (PR).

In a stratified analysis by funding type in the 2 regions, the prevalence of bedridden older people was significantly lower in private LTCFs outside of the East macroregion (PR = 0.55; 95%CI 0.40–0.76). The incidence of COVID-19 among older residents was lower in the East macroregion, both in private LTCFs (RR = 0.75; 95%CI 0.62–0.91) and in philanthropic institutions (RR = 0.79; 95%CI 0.70–0.89). However, fatality was higher in private LTCFs than in philanthropic ones in the East macroregion (RR = 1.68; 95%CI 1.04–2.69), as was the mortality rate (RR = 1.82; 95%CI 1.11–2.99). Private LTCFs in the East macroregion had a higher hospitalization rate when compared to philanthropic LTCFs in the same region (RR = 1.66; 95%CI 1.28–2.17), to other private LTCFs in other macroregions (RR = 2.12; 95%CI 1.36–3.31), and to philanthropic organizations in other macroregions (RR = 1.24; 95%CI 1.72–2.91). No significant difference was observed in COVID-19 incidence among workers of philanthropic and private facilities (Table 3).

DISCUSSION

This study shows that the state of Bahia contains only a small number of public LTCFs, contrasting with a predominance of philanthropic facilities. This matches the findings of a census performed by the Institute of Applied Economic Research (IPEA) in 2010, which indicated that 65% of the 3600 LTCFs in Brazil corresponded to philanthropic

institutions.¹⁰ This reveals that the institutionalization of older people in Brazil still takes place under a logic of philanthropy and not as part of a public policy. There is an evident need to move from a tradition of benevolence to a vision of state guaranteed rights.¹¹ Unlike other parts of the state, the region encompassing the state capital showed a predominance of private LTCFs, which may be associated with socioeconomic differences between regions. Similarly, a survey of 156 LTCFs in the metropolitan region of Belo Horizonte showed that 62% were privately funded and 38% were philanthropic.¹² The lack of public policies targeted at LTCFs, in LMICs, has contributed to a rapid growth of these private organizations, often for profit, which now predominate in larger cities.⁹

The prevalence of bedridden people in the studied LTCFs (restricted to 20% of the older residents) is noteworthy, being even lower in private institutions. There is evidence that many LTCFs, especially in LMICs, prefer not to admit people with high levels of dependence.⁹ In the study about LTCFs in the metropolitan region of Belo Horizonte, some managers reported that the level of dependence (13.8%) and the presence of a psychiatric disorder (13.8%) were among the criteria for rejecting admission of older people, in addition to bedridden or tracheostomized people and cases of dementia or infectious diseases.¹²

The COVID-19 incidence rates among older residents (30.71%) and workers (19.86%) of LTCFs observed in this study are within the wide range revealed by a systematic

Table 3. COVID-19 morbidity and mortality in LTCFs in the East macroregion and the rest of Bahia according to funding type

	East macroregion		Rest of the state	
	Private (n = 48)	Philanthropic (n = 42)	Private (n = 11)	Philanthropic (n = 52)
Total number of LTCF residents	798	1319	298	1515
Prevalence of bedridden residents	21.43%	21.15%	12.08%	21.98%
Total number of LTCF workers	630	741	176	950
COVID-19 cases among older residents	219	333	109	484
Hospitalizations of older residents due to COVID-19	81	74	19	80
Deaths of older residents due to COVID-19	32	29	11	51
COVID-19 cases among LTCF workers	117	156	38	201
COVID-19 incidence rate among older residents	27.44%	25.25%	36.57%	31.95%
COVID-19 incidence rate among LTCF workers	18.57%	21.05%	21.59%	21.16%
COVID-19 hospitalization rate among older residents	36.99%	22.22%	17.43%	16.53%
COVID-19 fatality rate among older residents	14.61%	8.71%	10.09%	10.54%
COVID-19 mortality rate among older residents	4.01%	2.20%	3.69%	3.37%

COVID-19: coronavirus disease 2019; LTCFs: long-term care facilities.

review of studies reporting primary data on COVID-19 morbidity and mortality in LTCFs. This review found COVID-19 incidence rates between 0.0% and 71.7% among residents and between 0.4% and 64.0% among staff, although the generalizability of these studies is limited.¹³ The lower COVID-19 incidence among LTCF residents and workers in the East macroregion compared to the rest of the state is noteworthy. This may indicate that LTCFs outside the East macroregion had more difficulty in adopting the protective measures recommended by the Brazilian Society of Geriatrics and Gerontology.¹⁴ These measures, published in the Technical Note of the Health Department of the State of Bahia,¹⁵ include correct hand hygiene, use of masks, isolation of suspected cases, and good ventilation. This requires further research, as the available data do not allow us to confirm this hypothesis.

The COVID-19 mortality in LTCFs described in this study (3.57%) is within the range described in countries for which data are available, ranging from 0.02% in Singapore and 0.04% in New Zealand to more than 5% (more than 1 in 20 LTCF residents have died from COVID-19) in Belgium, France, Netherlands, Slovenia, Spain, Sweden, United Kingdom, and the USA.³ On the other hand, COVID-19 fatality in LTCFs in Bahia (11.6%) was lower than those described in other locations. A population-based study in South Carolina (USA) described a mortality rate of 23.9% in 7366 older residents of LTCFs between March 2020 and February 2021.¹⁶ Similarly, in Madrid (Spain), the follow-up of 2668 older people residing in 39 LTCFs described a mortality rate of 22% in the second wave of the pandemic, between August 2020 and February 2021.¹⁷ Although no official data are available on COVID-19 fatality in Brazilian LTCFs, a descriptive cross-sectional study of 2154 facilities located in 14 Brazilian states showed a fatality rate of 22.4%.¹⁸ The lower COVID-19 fatality in LTCFs of the state of Bahia may be associated with a lower prevalence of comorbidities and functional dependence in their residents, reflecting the institutionalization of older people happening due to social rather than clinical-functional aspects; however, the present study does not provide such information nor the ages of residents. The under-reporting of COVID-19 deaths could also have happened, due to misdiagnosis or to possibly intentional attempts by care homes to mask the situation.

Private LTCFs had higher hospitalization, fatality, and mortality rates due to COVID-19, denoting greater severity of cases. An association between these rates and a higher prevalence of bedridden people would be expected, but this prevalence was greater in philanthropic LTCFs.

The risk of developing severe COVID-19 is associated not only to functional dependence, but to several diseases that are prevalent among older people, such as chronic kidney disease, obesity, hypertension, and diabetes.^{1,2} A study in South Carolina (USA) comparing LTCF residents and community-dwelling older people showed that the prevalence of chronic diseases and COVID-19 hospitalization rates were greater in LTCFs.¹⁶ One of the limitations of the present study is its use of secondary and aggregated data. Data were not available for the prevalence of chronic diseases in LTCFs or for individual information on those older residents who had different outcomes. Although these data are not generalizable, they may be used for comparison with LTCFs from other locations.

CONCLUSION

This study reveals that COVID-19 morbidity and mortality in LTCFs in the state of Bahia were consistent with the wide ranges described in the literature, although case fatality was lower than expected. This demonstrates the importance of strategies to coordinate, identify, assess, and target support for LTCFs, highlighting the need for stronger public policies for LTCFs in Bahia, Brazil, as well as in other LMICs. The small number of public LTCFs and the predominance of philanthropic LTCFs highlight the need to move from a tradition of benevolence to a vision of rights guaranteed by the State.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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AUTHORS' CONTRIBUTION

MBD: conceptualization, supervision, validation, writing – review & editing. ILD: formal analysis, writing — original draft. LMSF: formal analysis, writing — original draft. MHF: conceptualization, validation. HPON: conceptualization, validation, writing — original draft. JCS: conceptualization, validation, writing — original draft. DON: conceptualization, validation, writing — original draft. PLS: validation, visualization, writing – review & editing.

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