People with Disabilities and COVID-19 in the state of Espírito Santo, Brazil: between invisibility and lack of Public Policies

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Abstract *This article aims to analyze the profile of people with disabilities among the cases notified by the COVID-19 panel of Espírito Santo and the possible associations with the positive result of the COVID-19 test. Descriptive cross-sectional study among people with disabilities with positive and negative tests for the diagnosis of COVID-19. Associations of epidemiological and clinical variables were performed using the chi-square test and logistic regression models to estimate the odds ratio. Lethality rate of COVID-19 was 4.9% (175 cases) in the group of people with disabilities, and 3% (3,016) in the group without disabilities. People with disabilities, male (OR=1.34; 95%CI 1.22-1.47), race/black color (OR=1.55; 95%CI 1.09-2.20), and those who were hospitalized (OR=2.27; 95%CI 1.71-3.02) were associated with positive tests for COVID-19. The pandemic emphasizes the need to create specific legal care mechanisms and targeted public policies for this population.*

Key words *Cross-sectional study, People with disabilities, Health, COVID-19*

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Introduction

In March 2020, the World Health Organization (WHO) declared COVID-19, a disease caused by the new coronavirus, a global pandemic[1]. Brazil is the second country in the Americas in the number of infected people tested positive for the disease and in the number of deaths[2] resulting from it. Since the pandemic onset, several actions and sanitary strategies were adopted by the state and municipal governments aiming to stop the advance of COVID-19. Among the implemented actions were quarantine and social distancing, with the reduction of economic activities to the minimum necessary until the total interruption of social and cultural activities (events, religious practices, sports activities) involving some kind of crowding[3].

As the studies were published, they contributed to the identification of factors associated with higher chances of the disease and death (such as the elderly, pregnant women, socially vulnerable population, and people with disabilities). Particularly, people with disabilities (PWDs) stand out as they present specific vulnerability situations due to health conditions, housing, mobility, education, lack of accessibility to transportation, among others[4-6].

In Brazil, until the first half of the 20th century, the situation of PWDs was one of invisibility, marked by an initial phase of elimination and exclusion. In the second half of the 20th century, there was a period of partial integration through specialized care in clinics and hospitals. The issue of disability ceased to be the sole responsibility of the family and started being shared with the State[7,8]. During the COVID-19 pandemic, information about people with disabilities who were infected or died from COVID-19 was not included in the official data. This absence of information and specific diagnoses makes it considerably difficult to conduct research and data analysis, in addition to the development of targeted public policies.

On March 17, 2020, the United Nations (UN) published a worldwide alert about the abandonment and risk of contamination of this group. Because of the pandemic, many PWDs could not count on caregivers to conduct their daily activities. Containment measures such as social distancing and isolation may not be possible for those who need support to feed, dress, or perform basic care[9].

In Brazil, the Brazilian Inclusion Law (*Lei Brasileira de Inclusão* - LBI), Law No. 13,146[10], in art. 10, guarantees that, in situations of risk or public calamity, the person with disability will be considered vulnerable, and the government must adopt measures for protecting such person. The same law, in § 2 of art. 9, when referring to priority treatment, indicates that in emergency services, priority conferred by this law is conditional on medical care protocols[9]. In this context, the state of Espírito Santo stands out with Law 11,130/2020[11] that includes people with disabilities in the risk group, thus enabling the inclusion of this variable in the COVID-19 public panel (database with the notified cases of COVID-19 in the state of Espírito Santo, are available on the website: https://coronavirus.es.gov.br/painel-covid-19-es)[11].

The state of Espírito Santo (ES) is located in the southeast region of Brazil, comprising 78 municipalities, with a territorial area of 46,074.447 km². According to the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística* - IBGE), the state has 3,514,952 inhabitants, and 23.45% of its population has at least one disability[12].

In this sense, the present study aimed to analyze the profile of PWDs among the cases notified by the COVID-19 panel in Espírito Santo and the possible associations with the positive result of the COVID-19 test.

Methods

Study type

An exploratory descriptive cross-sectional study was carried out among PWDs with confirmed and discarded diagnoses for COVID-19 from the COVID-19 Panel database, available on the website: https://coronavirus.es.gov.br/painel-covid-19-es, of the State Secretariat of Health of Espírito Santo (SESA)[13].

Study Population

All data from the panel of suspected COVID-19 persons were analyzed, totaling 340,145 records, from February 17 to September 2, 2020. The total number of persons with disabilities was 9,408, accounting for 2.8% of the overall total.

Federal Law No. 13,146 of June 2016, art. 2, considers a person with a disability to be "one who has a long-term physical, mental, intellectual, or sensory impairment which, in interaction

with one or more barriers, may hinder his or her full and effective participation in society on an equal basis with others"[10].

On May 28, 2020, the state government of Espírito Santo published law n° 11,130, which includes people with disabilities in the priority care group, due to the COVID-19 (coronavirus) pandemic, in compliance with the Brazilian Inclusion Law (Law No. 13,146)[11].

Data regarding people with disabilities were not made available from the panel onset, but only as of August 22, 2020, after several scientists, politicians, and social movements in the state requested their availability.

Variables

The variables studied were grouped into:

Disease confirmation and evolution variables: classification (confirmed and discarded), evolution (cure or death due to COVID-19) and confirmation criteria (clinical, clinical-epidemiological, and laboratory).

Epidemiological variables: municipality of residence, age group, gender (male, female), race/color (yellow, white, indigenous, brown, black, and unknown), education (illiterate, incomplete 1st to 4th grade, complete 4th grade, incomplete 5th to 8th grade, complete elementary school, incomplete high school, complete high school, incomplete higher education, complete higher education, not applicable, and unknown).

Variables of symptoms, with positive or negative answers: fever, difficulty breathing, cough, runny nose, sore throat, diarrhea, and headache.

Comorbidity variables, with positive or negative responses: pulmonary comorbidity, cardiovascular comorbidity, renal comorbidity, diabetes, obesity.

Other variables were analyzed, from the following questions: "In the last 14 days, did you travel to a municipality in the Brazilian territory with local transmission of COVID-19?", with positive or negative answers; "In the past 14 days, were you hospitalized?", with positive or negative answers.

Statistical Analyses

The Microsoft Excel application was used to organize the COVID panel database. Logistic regression was used to quantify the associations between test scores for COVID-19 and the other variables included in the study. These associations were described by odds ratio (OR) and their cor-

responding 95% confidence intervals (95%CI), with each variable considered separately.

The prevalence rates of COVID-19 in the municipalities of Espírito Santo were described through georeferencing with the state digital mesh included in the ArcGis 10.1 program, with the elaboration of a thematic map. The population data used for the calculation and the geographic information are available on the website of the IBGE[12].

Ethical considerations

This study was approved by the Research Ethics Committee of the Health Sciences Center of the Federal University of Espírito Santo (CEP/CCS/UFES) and approved under opinion No. 3,908,434 on May 20, 2020.

Results

A total of 340,145 notifications of suspected case for COVID-19 were evaluated in the study period, as shown in Figure 1, and 10.8% (36,843) of the cases were excluded since they did not present the information related to persons with disabilities.

The cases that showed some disability with confirmed or discarded diagnosis for COVID-19 were used for data analysis. Suspected cases were excluded from the analysis, representing 24.5% (2,305) of the notifications. Thus, the final sample consisted of 7,103 (75.5%) notified cases of people with disabilities. As for the diagnostic classification of the disease, there were 38.2% positive and 37.3% negative cases (Figure 1).

Lethality rate of COVID-19 was 4.9% (175 cases) in the group of people with disabilities, and 3% (3,016) in the group without disabilities. Deaths from other causes are also higher in the groups of people with disabilities compared to the group without disabilities (Figure 1).

The sociodemographic profile found in people with disabilities is most frequently represented by: females (56.90%), aged 30-39 years (19.8%), white race/color (82.40%), complete higher education (30.10%), individuals living in the interior of the state (61.30%), no history of travel to other cities in Brazil (90%), and no history of hospitalization in the last 14 days before the flu symptoms (94.20%) (Table 1).

People with disabilities who were male (OR=1.34; 95%CI 1.22-1.47), race/black (OR=1.55; 95%CI 1.09-2.20), and those who

were hospitalized (OR=2.27; 95%CI 1.71-3.02) showed an association with positive tests for COVID-19 (Table 1).

Figure 2 presents the symptoms reported by the study subjects in the positive and negative groups for COVID-19. PWDs with positive results for SARS-CoV-2 had a higher percentage of cough (p=0.001; OR=1.20; 95%CI 1.10-1.32) and fever (p=0.001; OR=1.65; 95%CI 1.50-1.82). PWDs with negative results more frequently reported coryza (p=0.006; OR=0.87; 95%CI 0.79-0.96) and sore throat (p=0.001; OR=0.82; 95%CI 0.73-0.91).

In Figure 3, it is observed that, through georeferencing, seven PWDs municipalities of residence showed higher prevalence of coronavirus infection (greater than 20% per 10,000 thousand inhabitants) and all are located in the interior of the state: São Gabriel da Palha, Ibiraçu, São José do Calçado, Apiacá, Vargem Alta, Iconha, and Alfredo Chaves.

Confirmation of the diagnosis was obtained through laboratory tests in 90.7% of the confirmed cases (positive) and in 91.4% of the discarded cases (negative). The remaining cases were confirmed clinically and clinically epidemiologically. Of the total number of confirmed cases, 175 (4.9%) died from COVID-19 and two (0.1%) from other causes, while in the discarded cases group there were 74 deaths from other causes (2.1% of the sample). Of the confirmed cases, 3358 cases were cured (Figure 1).

The profile of PWDs who died from coronavirus was formed by males (57.1%), 60 to 79 years old (51.4%), white (80.4%), illiterate (21.4%) and residents of Greater Vitória (56.6%). A total of 59.4% of the cases were admitted to the hospital. The most frequent comorbidity was cardiovascular (63.8%). The three main symptoms reported were: difficulty breathing (63.2%), cough (56.6%), and fever (56.4%) (Table 2).

The risk of dying from COVID-19 in people with disabilities is higher in the categories of male gender (OR=1.58; 95%CI 1.16-2.15); race/color brown (OR=1.38; 95%CI 0.47-4.10) and black (OR=1.34; 95%CI 0.35-5.19); age groups 70 to 79 years (OR=5.89; 95%CI 1.38-25.10), 80 to 89 years (OR=9.94; 95%CI 2.30-43.01) and 90 years
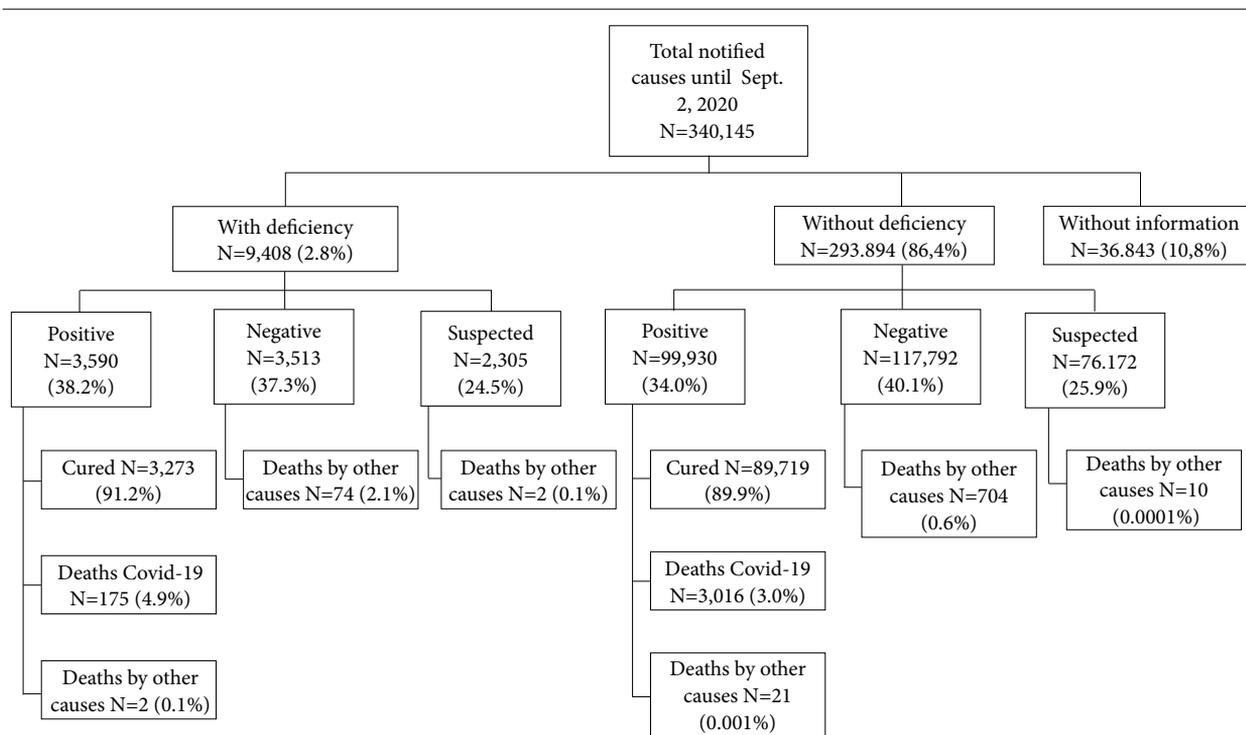

Figure 1. Flowchart of the COVID-19 panel records for people with disabilities, according to the classification and evolution of cases. Espírito Santo, 2020.

Source: Authors.

or older (OR=26.73; 95%CI 5.78-123.67); and illiterate (OR=2.00; 95%CI 1.04-3.87). Deaths were also more frequent among PWDs who had symptoms of fever (OR=1.47; 95%CI 1.08-2.00), respiratory distress (OR=6.89; 95%CI 5.00-9.49), pulmonary (OR=2.55; 95%CI 1.50-4.34), cardiovascular (OR=6.08; 95%CI 4.41-8.37), renal (OR=6.26; 95%CI 2.78-14.08) comorbidities, and diabetes (OR=5.93; 95%CI 4.24-8.29) (Table 2).

Discussion

This study suggests that PWDs have a higher lethality rate compared to those without disabilities. PWDs who died from COVID-19 had at least one registered comorbidity, with cardiovascular diseases being the most frequent (63.8%).

No data regarding COVID-19 morbidity and mortality among people with disabilities were

Table 1. Sociodemographic profile of patients with disabilities according to the results of the COVID-19 tests. Espírito Santo, 2020.

Variable	Category	Total		Confirmed N=3.590		Discarded N=3.513		OR	LL 95%	UL 95%
		N	%	N	%	N	%			
Sex	Female	4,039	56.9	1,916	53.4	2,123	60.4	ref		
	Male	3,063	43.1	1,674	46.6	1,389	39.6	1.34	1.22	1.47
Age Group	0 to 4 years	130	1.8	60	1.7	70	2.0	ref		
	5 to 9 years	95	1.3	43	1.2	52	1.5	0.92	0.55	1.55
	10 to 19 years	350	4.9	162	4.5	188	5.4	0.95	0.54	1.67
	20 to 29 years	1,026	14.4	507	14.1	519	14.8	0.92	0.59	1.43
	30 to 39 years	1,406	19.8	729	20.3	677	19.3	0.81	0.54	1.22
	40 to 49 years	1,295	18.2	658	18.3	637	18.1	0.73	0.49	1.10
	50 to 59 years	1,081	15.2	558	15.5	523	14.9	0.76	0.51	1.15
	60 to 69 years	829	11.7	445	12.4	384	10.9	0.74	0.49	1.11
	70 to 79 years	486	6.8	252	7.0	234	6.7	0.68	0.45	1.03
	80 to 89 years	303	4.3	131	3.6	172	4.9	0.73	0.48	1.13
	90 years or older	102	1.4	45	1.3	57	1.6	1.04	0.66	1.63
Race/Color	Yellow	182	2.7	85	2.5	97	2.9	ref		
	White	5,601	82.4	2,913	84.2	2,688	80.4	1.36	0.88	2.11
	Indigenous	5	0.1	3	0.1	2	0.1	1.10	0.79	1.53
	Brown (*Parda*)	866	12.7	377	10.9	489	14.6	0.80	0.13	4.91
	Black	147	2.2	80	2.3	67	2.0	1.55	1.09	2.20
Education	Illiterate	321	6.3	152	6.4	169	6.3	-	-	-
	Not applicable	158	3.1	76	3.2	82	3.0	-	-	-
	Elementary School (incomplete 1-4th grade)	527	10.4	252	10.6	275	10.2	ref		
	Elementary School (complete 4th grade)	298	5.9	151	6.3	147	5.4	0.96	0.79	1.16
	Elementary School (incomplete 5-8th grade)	491	9.7	232	9.7	259	9.6	0.85	0.67	1.09
	Elementary School (complete)	438	8.6	211	8.9	227	8.4	0.98	0.80	1.19
	High School (incomplete)	383	7.5	178	7.5	205	7.6	0.97	0.77	1.23
	High School (complete)	1,532	30.1	716	30.1	816	30.2	1.11	0.95	1.30
	Higher Education(incomplete)	142	2.8	68	2.9	74	2.7	0.94	0.77	1.16
	Higher Education (complete)	795	15.6	345	14.5	450	16.6	0.98	0.82	1.20
Municipality	Greater Vitória	2,719	38.3	1,483	41.3	1,236	35.2	1.20	1.11	1.29
	Interior of the state	4,353	61.3	2,086	58.1	2,267	64.5	0.92	0.87	0.98
	Other States	31	0.4	21	0.6	10	0.3	ref		
Travel in Brazil	No	4,124	90.0	2,055	90.4	2,069	89.6	ref		
	Yes	459	10.0	219	9.6	240	10.4	0.92	0.76	1.11
Hospitalized	No	3,785	94.2	1,989	92.7	1,796	95.9	ref		
	Yes	233	5.8	156	7.3	77	4.1	2.27	1.71	3.02

OR: odds ratio. Ref: reference category. LL 95%: Lower Limit of the 95% Confidence Interval. UL 95%: Upper Limit of the 95% Confidence Interval.
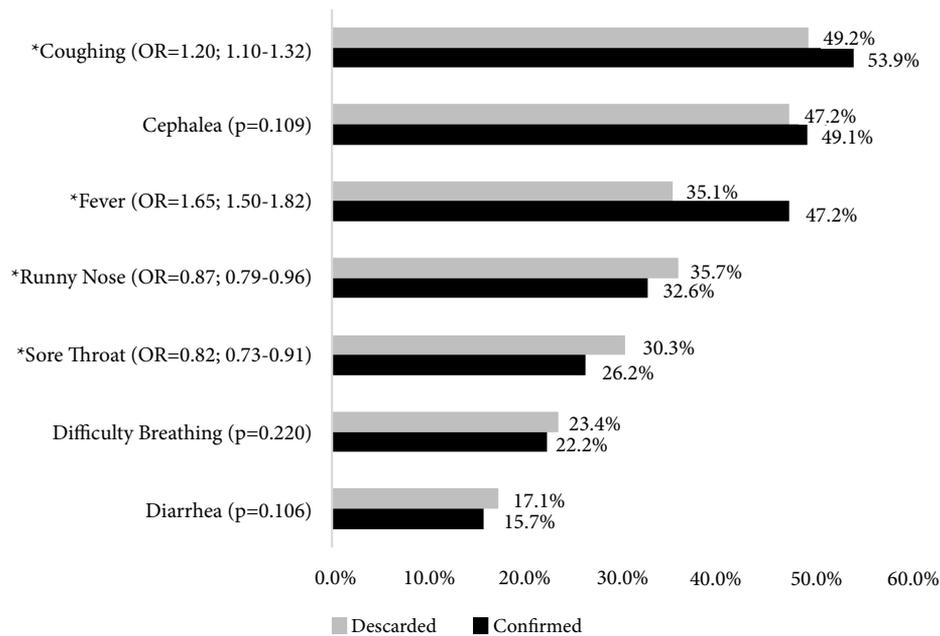
Source: Authors.

Figure 2. Symptoms reported by patients with disabilities according to COVID-19 tests in the state of Espírito Santo, 2020.

P: p-value of the chi-square test. OR: odds ratio with the respective lower and upper 95% limits.
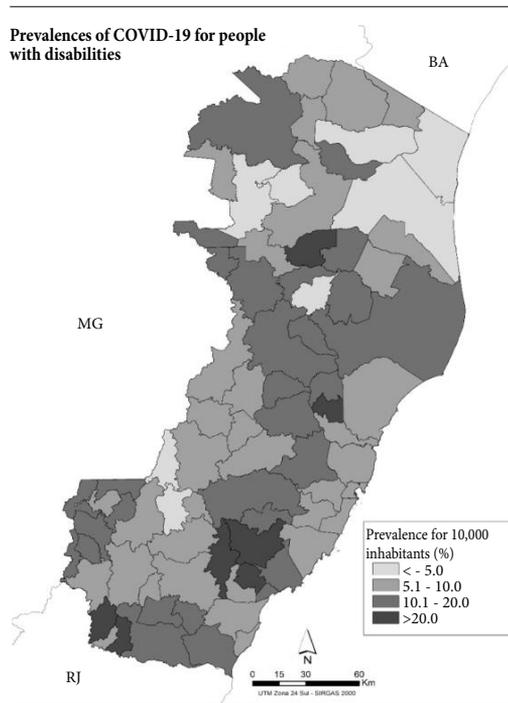
Source: Authors.

Figure 3. Prevalences of COVID-19 in ES municipalities of residence for people with disabilities, 2020.

Source: Authors.

found in the national and international literature. The case fatality rate for COVID-19 among people with disabilities in the present study was 4.9%. People with disabilities are especially exposed to coronavirus infection, have an increased risk of contracting the virus due to existing comorbidities, and face additional barriers to health care during a pandemic since they cannot always maintain physical distancing measures, especially if they need assistance with feeding and mobility[14,15]. Other barriers that PWDs face when seeking access to health care include long waiting times for appointments or rehabilitation therapies, discrimination, high costs, and transportation problems[15].

People with disabilities belong to a population with a higher prevalence of multiple chronic conditions[16], which contributes to the worsening of the condition of the patient affected by COVID-19 and increases the risk of death.

Due to the specificities of some disabilities, these people may have difficulty in performing some daily prevention measures, making them more vulnerable compared to the general population. Daily preventive actions, such as performing basic hygiene and social distancing, are

Table 2. Epidemiological profile of patients with disabilities who evolved to death due to COVID-19 in the state of Espírito Santo, 2020.

Variable	Categories	Hospital discharge (N=3,273)		Deaths (N=175)		OR	LL 95%	UL 95%
		N	%	N	%			
Sex	Female	1,774	54.2	75	42.9	ref		
	Male	1,499	45.8	100	57.1	1.58	1.16	2.15
Age Group	0 to 4 years	56	1.7	2	1.1	ref		
	05 to 9 years	41	1.3	1	0.6	0.68	0.06	7.79
	10 to 19 years	156	4.8	1	0.6	0.18	0.02	2.02
	20 to 29 years	492	15.0	2	1.1	0.11	0.02	0.82
	30 to 39 years	700	21.4	5	2.9	0.20	0.04	1.05
	40 to 49 years	621	19.0	6	3.4	0.27	0.05	1.37
	50 to 59 years	514	15.7	14	8.0	0.76	0.17	3.44
	60 to 69 years	383	11.7	49	28.0	3.58	0.85	15.14
	70 to79 years	195	6.0	41	23.4	5.89	1.38	25.10
	80 to 89 years	93	2.8	33	18.9	9.94	2.30	43.01
	90 years or older	22	0.7	21	12.0	26.73	5.78	123.67
Race/Color	Yellow	75	2.4	4	2.4	ref		
	White	2,683	85.0	135	80.4	0.94	0.34	2.62
	Indigenous	2	0.1	0	0.0	-	-	-
	Brown	326	10.3	24	14.3	1.38	0.47	4.10
	Black	70	2.2	5	3.0	1.34	0.35	5.19
Education	Illiterate	122	5.7	21	22.3	2.00	1.04	3.87
	Elementary School incomplete 1-4th grade (former *primário* or 1st grade)	221	10.4	19	20.2	ref		
	Elementary School complete 4th grade (former *primário* or 1st grade)	137	6.5	10	10.6	0.85	0.38	1.88
	Elementary School incomplete 5-8th grade (former *ginásio* or 1st grade)	205	9.7	16	17.0	0.91	0.45	1.81
	Elementary School complete (former *ginásio* or 1st grade)	198	9.3	6	6.4	0.26	0.14	0.50
	High School incomplete (former *colegial* or 2nd grade)	170	8.0	4	4.3	0.35	0.14	0.90
	High School complete (former *colegial* or 2nd grade)	678	31.9	15	16.0	0.39	0.15	0.90
	Higher Education (complete)	330	15.5	3	3.2	0.09	0.03	0.30
	Higher Education (incomplete)	62	2.9	0	0.0	-	-	-
Symptoms*	Fever	1,533	46.9	97	56.4	1.47	1.08	2.00
	Difficulty Breating	653	20.0	110	63.2	6.89	5.00	9.49
	Coughing	1,760	53.8	98	56.6	1.12	0.82	1.53
	Runny Nose	1,094	33.4	37	21.4	0.54	0.37	0.78
	Sore Throat	888	27.1	18	10.4	0.31	0.19	0.51
	Diarrhea	526	16.1	18	10.4	0.61	0.37	1.00
	Cephalea	1,635	50.0	47	27.3	0.38	0.27	0.53
Comorbidities*	Pulmonary diseases	133	4.1	17	9.8	2.55	1.50	4.34
	Cardiovascular diseases	735	22.5	111	63.8	6.08	4.41	8.37
	Kidney diseases	25	0.8	8	4.6	6.26	2.78	14.08
	Diabetes	273	8.3	61	35.1	5.93	4.24	8.29
	Smoking	68	2.1	7	4.0	1.97	0.89	4.36
	Obesity	148	4.5	11	6.3	1.42	0.76	2.68

*Answers yes or no. We presented the answer yes. OR: odds ratio. Ref: reference category. LL 95%: Lower limit of 95% Confidence Interval. UL 95%: Upper limit of 95% Confidence Interval.

Source: Authors.

obstacles faced by people with disabilities who need support and care from others[17]. More than 75% of the disabled patients with COVID-19 who died did not have completed high school. This data highlights the urgency of promoting the accessibility of content and access to information about transmission, prevention, and possible treatment during the pandemic period. Such information should contemplate the diversities and practicalities of disabilities. Boyle *et al.*[18] reinforce in their study the importance of people with disabilities having accessible information about the virus so they can protect themselves[18]. All communication should be disclosed in simple language and in accessible formats and personal communication strategies should be safe and accessible, ensuring, for example, sign language interpreters and the use of transparent masks by health professionals to allow lip reading[15].

Therefore, it is necessary to create campaigns, interviews, and pronouncements with general and specific guidelines, with interpreters of the Brazilian Sign Language (Libras), image description, magnification, and contrast in the production of information leaflets.

Disability is a unique life experience, a human condition[19] and, within this scenario, people with disabilities are significantly impacted by the absence of national articulation and public policies that mitigate the losses and inequalities experienced by them. The absence of articulation from the federal government to deal with the challenges of the pandemic, facing the context of social isolation, organization of health actions, and the suspension of classes in educational establishhments[20], in addition to specific national actions aimed at guidance, support, and assistance to the disabled population to face the pandemic, proves the invisibility of this part of the population[21].

There is a need to consider disability as a marker in discussions about Brazilian social inequalities and public policies on access to health services, especially in the context of pandemic expansion and anomie of the federal entities responsible for mitigating such scenario[22].

A study conducted in Bangladesh revealed that the majority of people with disabilities were working in informal jobs as a consequence of the pandemic by COVID-19. They lost their jobs, had their income reduced, or were working without wages during the pandemic. The extreme income uncertainty resulted in consistent food insecurity, leading to household hunger[23].

Although the current study reveals important findings for the epidemiological surveillance of people with disabilities, it has a limitation that lies precisely in the absence of an item in the notification form of COVID-19 providing the information on the specificity of the disability. Due to the lack of this information, there is no data available in any of the three governmental instances, from the municipal to the federal level. Thus, the absence of data on this part of society in relation to the pandemic is evident.

The impact of the pandemic due to COVID-19 was greater for PWDs due to the closure of routine health services, which left many PWDs without access to rehabilitation services essential for their recovery and for the prevention of complications (rehabilitation medicine consultation, physiotherapy, occupational therapy and provision of orthoses). In addition, access to essential medicines for this portion of the population was also interrupted. This resulted in worsening disability, reduced mobility, and the development of many preventable complications that culminated in the deterioration of the quality of life of PWDs. And all this because, during the pandemic, the need to maintain essential rehabilitation services was not recognized as an essential health service[24].

From the data analyzed, there is a need to improve data collection on PWDs, including relevant variables to monitor this group at high risk of getting sick from COVID-19. This type of inclusion will allow a selective collection of data that contributes to better identify the profile of PWDs and to adopt specific prevention measures, with public policy actions that can guarantee, for example, the construction of accessible protocols, plans, and manuals, the feasibility of safe sanitary conditions, and the payment of an emergency amount to low-income families whose member is a person with disability. Also, if possible, the guarantee of remote work for PWDs during the pandemic.

Given the results of this study, it is important to emphasize the impact of health inequalities on the disabled population, considering that (1) this is a sector that shows more difficulties both for self-care and access to health services and educational activities, and that (2) these services should be considered essential activities. The pandemic emphasizes the need to have mechanisms to ensure the effectiveness of the rights of PWDs, especially in scenarios of health crises.

Collaborations

There was effective participation of all authors listed in the work, making public their responsibility for the content presented.

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