Social distancing measures in the fight against COVID-19 in Brazil: description and epidemiological analysis by state

Medidas de distanciamento social para o enfrentamento da COVID-19 no Brasil: caracterização e análise epidemiológica por estado

Medidas de distanciamiento social para el combate a la COVID-19 en Brasil: caracterización y análisis epidemiológico por estado

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Abstract

Social distancing measures have been widely adopted to mitigate the COVID-19 pandemic. However, little is known about the timing of measures' implementation, scope, and duration in relation to their impact. The study aimed to describe the social distancing measures implemented by Brazil's states and the Federal District, including the types of measures and the timing of their implementation. This is a descriptive study of the measures' type, chronological and epidemiological timing of the implementation, and scope. The survey of measures used searches in official websites of the government departments and each state's Government Register. The official number of COVID-19 cases and deaths were obtained from an official a data platform. We considered the following categories of social distancing measures: suspension of events, school closure, quarantine of risk groups, economic lockdown (partial or full), restrictions on transportation, and quarantine of the population. The implementation's timing considered both the chronological date and the epidemiological timing, based on the time since the 10th case or 1st death from COVID-19 in each state. All the states implemented distancing measures, mostly during the latter half of March 2020. Economic lockdown was implemented early, prior to the 10th case by 67% of the states and prior to the 1st death from COVID-19 by 89% of the states. Early social distancing measures were widely implemented in Brazil, before or in the initial phase of the exponential growth curve of COVID-19 cases and deaths in the great majority of states.

COVID-19; Social Isolation; Epidemiology

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Introduction

On March 11, 2020, the World Health Organization (WHO) declared a pandemic of COVID-19, the disease caused by the novel coronavirus SARS-CoV-2. The declaration was made when the epidemic, which began in Wuhan, China, was already present in 114 countries/territories/areas, reaching 118,319 cases and 4,292 deaths from the disease [1]. Three months later, more than 7 million cases had been reported in the world, with more than 408,000 deaths from COVID-19 in 215 countries/territories/areas around the world [2].

The rapid spread of SARS-CoV-2 in countries and communities due to the virus' high transmissibility, together with the lack of vaccines and specific and effective antiviral drugs for prevention and treatment of the disease, respectively, makes nonpharmacological interventions the most efficient options for the mitigation and control of COVID-19 at the local and global levels [3,4]. At the population level, such interventions feature social distancing measures, or the efforts aimed at flattening or interrupting the transmission chain by physical distancing between individuals that may be infected and healthy individuals, and to protect those individuals from the risk of developing severe form of disease. The measures include canceling mass events, temporary school and workplace closures, border closures, and recommendation for population self quarantine [5].

Social distancing measures had been used for the mitigation of previous epidemics and pandemics, including the influenza pandemic of 1918-1919 [6], the severe acute respiratory syndrome (SARS) epidemic in 2002-2003 [7], and the H1N1 influenza pandemic in 2009-2010 [8], and such measures are now widely recommended for the mitigation and control of the COVID-19 pandemic [5,9,10,11].

Starting with Wuhan, which began implementation of social distancing measures approximately three weeks after the onset of the epidemic [12], other Chinese cities, Asian countries, and various countries around the world implemented social distancing measures as community transmission was confirmed successively in these places [13]. Initial evidence already indicates that this strategy's adoption in various scenarios has been effective in containing the uncontrolled increase in COVID-19 cases and deaths, especially when associated with isolation of cases and quarantine of contacts of cases [11,12,14,15,16,17]. However, there is still uncertainty on the effectiveness of different types of measures when considered singly or combined, or the effect of the timing of these measures on the epidemiological progression of the disease.

Beyond the health sector, it is important to address the inevitable social and economic impacts of social distancing measures [18]. It is thus important to have a careful evaluation of the most appropriate epidemiological timing for the measures' implementation and duration, aimed at maximizing the intended health effects and minimizing the social and economic harms [3].

The first case of COVID-19 in Brazil was confirmed on February 26, 2020, in the city of São Paulo [19]. A month after this first confirmed case, every state of Brazil had already reported cases of the disease, with deaths recorded in eight states [20]. However, the trend in the number of cases and deaths differs between states [21], possibly due to sociodemographic and geographic differences, the timing of the infection's introduction, and states' and municipalities' autonomy to determine which measures to adopt to mitigate COVID-19 and the measures' timing, according to their respective scenarios [22]. It is thus necessary to map the measures implemented in the various states in order to raise hypotheses and assess the most appropriate timing for the implementation and the results of different measures in different states and regions of Brazil. To answer these questions, it is essential to have a complete database obtained through a systematic search process that records the types of measures adopted in each state, along with the timing of their implementation.

This study thus aimed to describe the social distancing measures implemented by the Brazilian states, including the types of measures and the chronological and epidemiological timing of their implementation, considering the number of COVID-19 cases and deaths in each location.

Methods

Study design, location, and period

This is a descriptive study with data from each of the 27 Brazilian states between the date of the first confirmed COVID-19 case in Brazil, February 26, 2020, and June 30, 2020.

Data source and collection

- **Social distancing measures**

A survey of the legislations on social distancing measures was conducted for each of the Brazilian states. The search was done on each state government's official website and Government Register (*Diário Oficial*). We reviewed the decrees, laws, rulings, technical notes, and decisions by the COVID-19 Emergency Committee (the latter in the State of Minas Gerais), all published during the study period.

The following information was extracted from the surveyed legislations and registered in a structured spreadsheet for this purpose: date of publication and description of the provision, type of measure implemented, and date of implementation. The data were collected from March 10 to July 1, 2020, by a team of three researchers.

- **Epidemiological data**

The number of COVID-19 confirmed cases and deaths that occurred during the study period notified by each state epidemiological surveillance system followed national and state standardization procedures [23], and were obtained from the Brasil.io platform (https://brasil.io/covid19/), which collects and reviews the data daily, keeping them more accurate and up-to-date. The source for this site is the official data reported by the epidemiological bulletins and reports of the 27 State Health Departments [24].

Categories of social distancing measures

The social distancing measures were grouped in 10 categories, which were later regrouped in six categories for this analysis, as described in Box 1.

Timing of the implementation of social distancing measures

The timing of the implementation of each social distancing measure considered both the chronological and epidemiological timing of its implementation. Generally, the chronological date was defined according to the following criteria: (a) date on which the legislation or measure entered into force or the date on which the legislation indicated that the measure should begin, and not the date on which the legislation was signed; (b) when the measure was implemented progressively per location, for example, beginning in the state capital and from there to the metropolitan area and finally the entire state, we considered the date by which the measure had been implemented in the entire state; and (c) for all the categories except economic lockdown, we only considered the date when the measure had been implemented in the entire state (and not when it had been implemented in only one or two municipalities).

For the category economic lockdown, we considered full economic lockdown when all five distancing measures were implemented, namely: (1) suspension of nonessential in-person public services and/or orientation from public employees via telework; (2) closing of business centers, gyms, and private sports centers; (3) suspension of functioning of food establishments, including ban on in-person service and/or on-site food consumption; (4) suspension of public service by service providers and other nonessential commercial establishments; and (5) suspension of nonessential industrial activities. When not all five measures were implemented, or when any of the measures was only partially implemented (for example, food or commercial establishments with restrictions on occupancy or closed only under some circumstances), when the measures were only implemented

Box 1

Categories of social distancing measures and details of measures included in each category.

Categories	Details
Suspension of events	Suspension of public and/or private events and cultural, leisure-time, religious, and sports activities
School closure	Suspension of educational activities (public and private, including daycare, preschool, primary, secondary, and university)
Quarantine of risk groups	Special work regimes (telework, home office, remote work) for employees in risk groups for COVID-19, i.e., 60 years or older, pregnant or breastfeeding women, and/or individuals with chronic diseases
Economic lockdown (full or partial)	Suspension of in-person service in nonessential public services and/or orientation for telework by public employees
	Closing of commercial centers (shopping malls, etc.), gyms, and private sports centers (i.e., commercial establishments that create crowding by definition)
	Suspension of functioning of food establishments (bars, restaurants, convenience stores, etc.), including ban on in-person service or on-site food consumption
	Suspension of services to the public by service providers and other nonessential commercial establishments
	Suspension of nonessential industrial activities
Restriction on transportation	Suspension or restriction of intermunicipal and/or interstate passenger transportation
Population quarantine	Recommendation for quarantine of the entire population

in the state capitals or in a group of municipalities but not in the entire state, or when the legislation recommended but did not enforce the suspensions, the economic lockdown was considered partial.

For the suspension of events, we considered the date of the suspension of events of any kind, regardless of audience size, whether or not they required public permits, and the suspension of cultural, leisure-time, religious, and sports events. We did not consider specific decrees related to events conducted by the state government on prior dates. For school closure, we considered the data of suspension of classroom activities in public schools. For quarantine of risk groups, we considered the date on which public employees belonging to risk groups were quarantined, namely: individuals over 60 years, pregnant women, and/or individuals with chronic noncommunicable diseases were instructed to work outside the physical installations of their respective agency, via telework. For the category restrictions on transportation, we considered the first date on which the suspension/ban was issued on collective transportation of intermunicipal and/or interstate passengers, in any modality (except air travel), public and/or private. We also considered cases in which the suspension or ban on transportation only applied to individuals from states and states and/or municipalities with COVID-19 cases that declared emergency situations. Finally, we defined the population quarantine as the date on which it was recommended for the population (from that moment on) to limit circulation to strictly necessary activities and/or increase the time sheltering at home.

The epidemiological timing of each measure's implementation was categorized arbitrarily as: (a) early, when it occurred before the first COVID-19 case was reported; (b) intermediate I, when it occurred between the first and tenth case; (c) intermediate II, when it occurred between the 11th and 50th case; and (d) late, when it occurred after the 50th case. This timing was also presented according to the number of days before or after the date of implementation of each category of measures based on the first confirmed death of the disease.

Data synthesis and analysis

For each state, we identified that chronological dates of implementation of each social distancing measure and calculated the difference in days between the first measure's date of implementation and the economic lockdown (full or partial).

The epidemiological timing of the measures' implementation in each state was categorized as early, intermediate I, intermediate II, and late. For the category economic lockdown, the timing was presented graphically, based on the first reported case of the disease in each location, on a log scale, grouped by states that had implemented full or partial lockdowns. The epidemiological timing of each category's implementation was also presented according to the number of days before or after the first reported COVID-19 death by state.

For data visualization, a public-access graphic interface (https://medidas-covidbr-iptsp.shinyapps.io/painel/) was elaborated that presents the trend in confirmed COVID-19 cases and deaths over time and the social distancing measures adopted in each state in response to the COVID-19 pandemic.

Since these were open-access secondary data, no approval was necessary from the Institutional Review Board.

Results

Four or more categories of social distancing measures were implemented in all the Brazilian states. Suspension of events and/or quarantine of risk groups were the first measures to be implemented, except in the state of Tocantins, which implemented suspension of school classes first. Mato Grosso do Sul, Tocantins, Espírito Santo, São Paulo, Federal District, and Rio Grande do Norte did not restrict intermunicipal and/or interstate passenger transportation, and 20 states did not implement a quarantine of the entire population (Table 1).

The first social distancing measures implemented in Brazil were in the Federal District, on March 11, 2020. In the other states, most of the measures were implemented in the second half of March, from March 13 to 28, 2020. Table 1 shows the time in days between implementation of the first measure and the full or partial economic lockdown in each state. Mato Grosso do Sul, Santa Catarina, and Rio Grande do Sul were the states that adopted these groups of measures in the shortest time, with a difference of one or two days. At the other extreme, in Pará, the time between implementation of the first measure and the economic lockdown was 50 days. In 74% of the states, the time between implementation of the first measure and the full or partial economic lockdown was one week or less.

The epidemiological timing of the social distancing categories varied little between Brazilian states, since most states implemented all the categories except the population quarantine between the first and tenth case of COVID-19. For suspension of events, suspension of classes, and quarantine of risk groups, some states, mainly in the North and Northeast of Brazil, implemented this set of measures before the first COVID-19 case was reported. Paraíba, Espírito Santo, and Maranhão were the only states that adopted some category of measures after the 50th case of COVID-19 (restrictions on transportation in Paraíba and population quarantine in Espírito Santo and Maranhão) (Table 2).

All seven states that implemented full economic lockdowns did so within 13 days after reporting the first COVID-19 case. Amapá and Maranhão implemented this category when they had one and two cases of COVID-19, respectively, and Ceará did so when it had 68 cases. Among the states that implemented partial lockdowns in the Central, South, and Southeast regions, the state of Mato Grosso announced the measure when six confirmed cases of the disease had been reported, while São Paulo already had 810 cases. In the North and Northeast regions, Roraima and Paraíba had one case each, Bahia had 127 cases, and Pará had 4,756 reported COVID-19 cases when the measure was implemented (Figure 1).

Table 3 shows the number of days before or after the first reported COVID-19 death in each state in relation to the date of implementation of the various social distancing measures. Most of the states implemented the measures before the first death, and Tocantins implemented the measures 30 days

Table 1

Date of implementation of different social distancing measures and time in days between date of first measure and economic lockdown (full or partial) by states of Brazil, 2020.

States	Suspension of events	School closure	Quarantine of risk groups	Full economic lockdown	Partial economic lockdown	Restriction on transportation	Population quarantine	Time between first measure and economic lockdown (days)
MS	March 20	March 23	March 20	NA	March 21	NA	NA	1
SC	March 17	March 19	March 16	NA	March 18	March 18	NA	2
RS	March 19	March 19	March 17	March 19	NA	March 19	April 1	2
RO	March 17	March 17	March 17	NA	March 20	March 20	March 20	3
SE	March 17	March 17	March 17	NA	March 20	March 23	NA	3
AP	March 20	March 18	March 17	March 20	NA	March 23	April 3	3
RJ	March 13	March 13	March 13	NA	March 17	March 17	NA	4
AC	March 16	March 18	March 20	March 20	NA	March 20	NA	4
CE	March 16	March 19	March 16	March 20	NA	March 23	NA	4
MA	March 16	March 17	March 22	March 21	NA	March 21	May 20	5
PR	March 16	March 20	March 16	NA	March 21	March 20	NA	5
PB	March 17	March 19	March 19	NA	March 22	May 20	NA	5
MG	March 19	March 18	March 17	NA	March 22	March 23	NA	5
TO	March 21	March 16	March 21	NA	March 21	NA	NA	5
GO	March 13	March 18	March 14	March 20	NA	March 20	NA	6
ES	March 17	March 23	March 18	NA	March 23	NA	May 25	6
PI	March 16	March 16	March 18	NA	March 23	April 06	NA	7
RR	March 16	March 17	March 23	NA	March 23	March 23	NA	7
MT	March 16	March 23	March 18	NA	March 23	March 23	NA	7
AM	March 17	March 19	March 16	NA	March 23	March 19	NA	7
AL	March 13	March 23	March 16	March 21	NA	March 23	NA	8
PE	March 14	March 18	March 17	NA	March 22	March 22	NA	8
SP	March 13	March 23	March 17	NA	March 24	NA	March 24	11
BA	March 19	March 19	March 17	NA	March 28	March 20	NA	11
DF	March 11	March 11	March 17	NA	March 23	NA	NA	12
RN	March 18	March 18	March 14	NA	April 2	NA	April 2	19
PA	March 16	March 16	March 16	NA	May 5	March 23	NA	50

AC: Acre; AL: Alagoas; AM: Amazonas; AP: Amapá; BA: Bahia; CE: Ceará; DF: Distrito Federal: ES: Espírito Santo; GO: Goiás; MA: Maranhão; MG: Minas Gerais; MS: Mato Grosso do Sul; MT: Mato Grosso; NA: not applicable; PA: Pará; PB: Paraíba; PE: Pernambuco; PI: Piauí; PR: Paraná; RJ: Rio de Janeiro; RN: Rio Grande do Norte; RO: Rondônia; RR: Roraima; SC: Santa Catarina; SE: Sergipe; SP: São Paulo; TO: Tocantins.

before the state's first reported death. In relation to partial economic lockdown, Pará, Rio Grande do Norte, and São Paulo were the only states that implemented this group of measures after the first death, with intervals of 34, 5, and 7 days, respectively.

Discussion

The Brazilian Supreme Court assigned to the states, Federal District, and municipalities the authority to decide on the implementation of social distancing measures to mitigate and suppress COVID-19 [22]. Thus, few Federal measures were implemented, and they were limited to restrictions on the entry of foreigners into Brazil [25] and the ruling that persons over 60 years of age should practice social distancing, limiting their movements to strictly necessary activities [26]. In addition

Table 2

Epidemiological timing of each Brazilian state's implementation of categories of social distancing measures according to number of confirmed COVID-19 cases. Brazil, 2020.

Categories	Epidemiological timing of social distancing measures			
	Early (before 1st case)	Intermediate I (case 1st to case 10)	Intermediate II (case 11th to case 50)	Late (after case 50)
Suspension of events	AC, MA, MT, PA, PB, PI, RO, RR	AL, AM, AP, CE, DF, GO, MS, PE, PR, RJ, RN, RS, SC, SE, TO	BA, ES, MG, SP	-
School closure	AP, MA, PA, PI, RO, RR, TO	AC, AM, CE, DF, GO, MG, MS, MT, PB, PE, PR, RJ, RN, RS, SC, SE	AL, BA, ES, SP	-
Quarantine of risk groups	AP, MT, PA, PI, RO	AC, AL, AM, CE, DF, GO, MA, MG, MS, PB, PE, PR, RJ, RN, RR, RS, SC, SE, TO	BA, ES, SP	-
Full economic lockdown	-	AC, AP, CE, GO, MA, RS	AL	-
Partial economic lockdown	-	AM, MS, MT, PB, PE, PI, PR, RO, RR, SC, SE, TO	BA, DF, ES, MG, PA, RJ, RN, SP	-
Restriction on transportation *	-	AC, AM, AP, CE, GO, MA, MT, PA, PE, PR, RO, RR, RS, SC, SE	AL, BA, MG, PI, RJ	PB
Population quarantine *	-	RO	AP, RN, RS, SP	ES, MA

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* Does not include states that had not implemented this category of social distancing.

to these measures, the Brazilian Ministry of Health announced an action plan on March 14, 2020, recommending that the municipal, state, and Federal District health departments assess and adopt nonpharmacological measures to control COVID-19, according to the local epidemiology of disease transmission [27].

As in other countries, the Brazilian states implemented not only a single measure, but a set of social distancing measures for which the evidence showed greater effectiveness for the mitigation and suppression of COVID-19, especially when associated with isolation of cases and contact quarantine [11,28,29]. Another important finding is that the progressive implementation of various types of measures occurred in a short time interval, mostly culminating in the full or partial lockdown of nonessential economic activities, following the same sequence as normally used in other countries that adopted these measures to fight COVID-19 [30].

Among the states and Federal District, the latter was the first to implement a series of social distancing measures, on exactly the same day as the WHO declared COVID-19 a pandemic [1]. From that date on, all Brazilian states launched measures that were mostly concentrated in the second half of March, less than a month since the first confirmed COVID-19 case in the country [19]. These findings corroborate those of the University of Oxford research group (The Oxford COVID-19 Government Response Tracker – OxCGRT), which conducted a survey and monitoring of social distancing measures in more than 160 countries and found that the governments' responses to COVID-19 have generally grown stronger over the course of the epidemic, with a major increase in the month of March, notwithstanding variations between countries [31].

In most Brazilian states, most of the social distancing measures were implemented before the tenth reported case and the first death from the disease, which was early when compared to the findings by Summan & Nandi [29], who assessed the timing of social distancing measures in various countries and found that the school closure occurred on average 13 days after the first reported case,
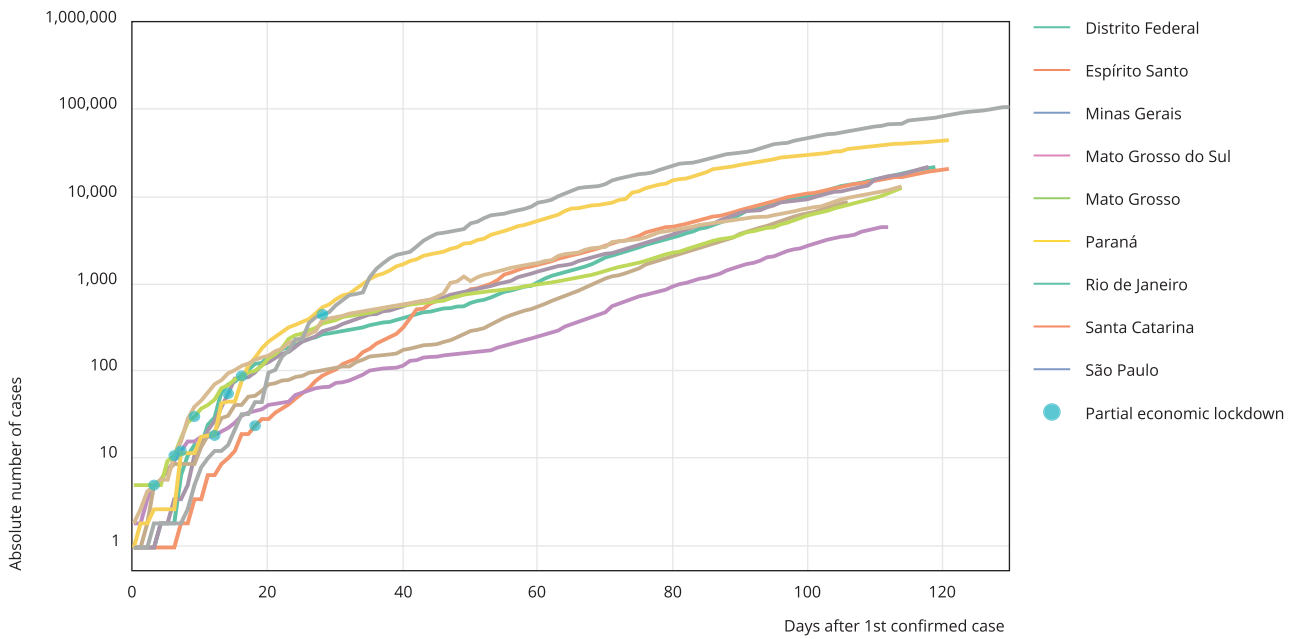
Figure 1

Epidemiological timing of the implementation of the categories full economic lockdown, partial economic lockdown for States in the South, Southeast, and Central Regions, and partial economic lockdown for States in the North and Northeast Regions, based on the first confirmed COVID-19 case. Brazil, 2020.
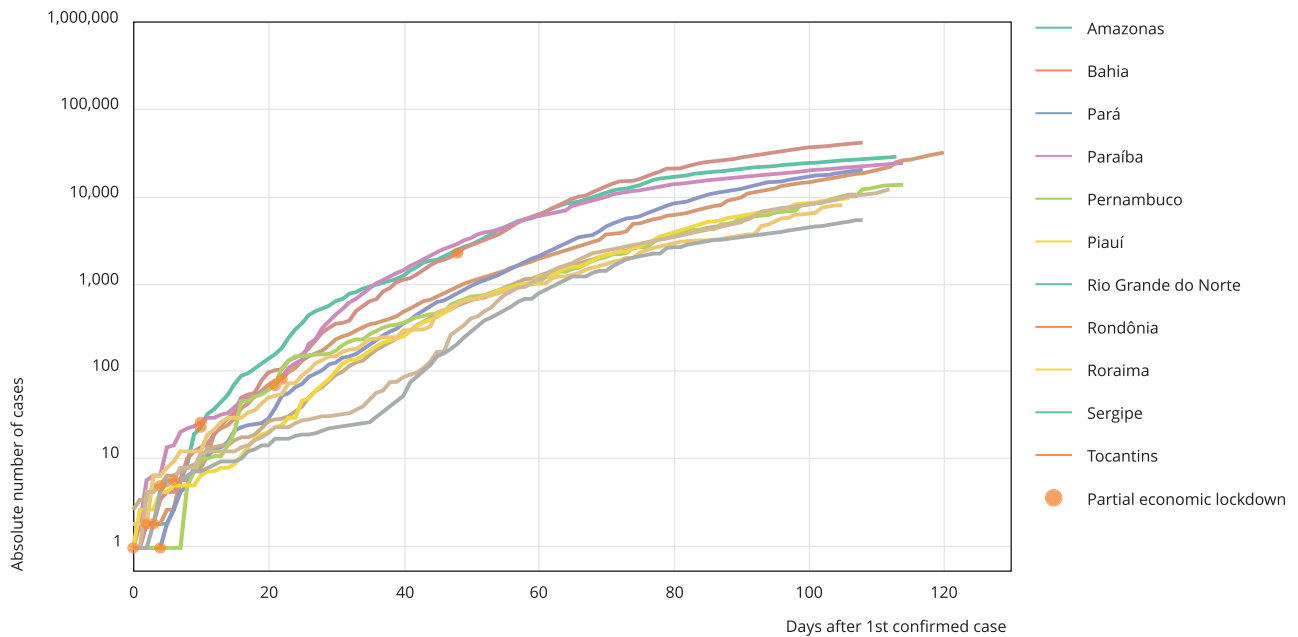
1a) Full economic lockdown
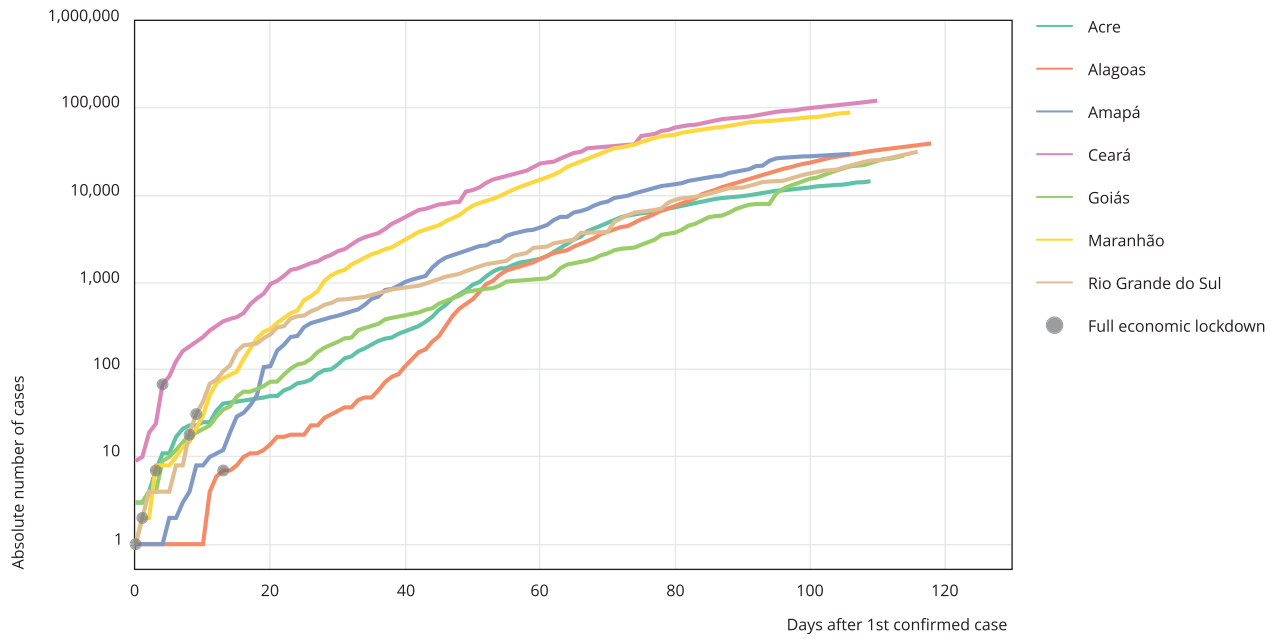
1b) Partial economic lockdown for States in the South, Southeast, and Central Regions

(continues)

Figure 1 (continued)

1c) Partial economic lockdown for States in the North and Northeast Regions

followed by restrictions on international air travel (average of 18 days) and national lockdowns, on average 21 days after the first case. Summan & Nandi [29] also found that poorer countries, those with more reported cases two weeks after the first case, less democratic systems, and those with smaller, less dense, and younger populations implemented these measures earlier, while wealthier countries with larger populations and that were better prepared in terms of the health system's response implemented the measures later in relation to the occurrence of local COVID-19 cases.

Evidence suggests that early adoption of social distancing measures is fundamental for slowing the disease transmission and thus flattening the curve of cases and reducing the demand on health services [3,14,32,33,34]. A study that simulated the COVID-19 epidemic in cities in Continental China estimated that if a series of nonpharmacological interventions, including social distancing, had been implemented one week, two weeks, or three weeks before the epidemic's onset in China, the number of COVID-19 cases could have been reduced by 66%, 86%, and 95%, respectively, besides significantly reducing the number of affected areas [35]. In the United States, a study in March-April 2020 concluded that the adoption of social distancing measures enforced by the Federal government reduced the daily growth rate by 5.4 percentage points after 1 to 5 days, 6.8 points after 6 to 10 days, 8.2 points after 11 to 15 days, and 9.1 points after 16 to 20 days [34].

In Brazil, a time series study of COVID-19 deaths in the state of São Paulo showed that social distancing strategies implemented from March 16 to 22, 2020, resulted in a substantial reduction in the number of infections, with the most evident reduction in the city of São Paulo from April 5 to 20. The author explains that the time between the measures' implementation and the reduction in the number of deaths was about 17 days, equivalent to the onset of symptoms and death from COVID-19 [36]. These findings corroborate those reported in another study that assessed the impact of nonpharmacological interventions in the cities of São Paulo and Rio de Janeiro, using mobility-oriented transmission models, and found that the reproduction rate (Rt) for SARS-CoV-2 over time in these cities dropped below

Table 3

Number of days before (-) or after (+) implementation of each category of social distancing measures in relation to first COVID-19 death in each state of Brazil, 2020.

State	Suspension of events	School closure	Quarantine of risk groups	Full economic lockdown	Partial economic lockdown	Restriction on transportation	Population quarantine	Date of first death
TO	-25	-30	-25		-25			April 15
AC	-21	-19	-17	-17		-17		April 6
DF	-18	-18	-12		-6			March 29
RR	-18	-17	-11		-11	-11		April 3
MT	-18	-11	-16		-11	-11		April 3
AL	-18	-8	-15	-10		-8		March 31
SE	-16	-16	-16		-13	-10		April 2
PA	-16	-16	-16		34	-9		April 1
ES	-16	-10	-15		-10	-10	53	April 2
AP	-15	-17	-18	-15		-12	-1	April 4
PB	-14	-12	-12		-9	50		March 31
RO	-13	-13	-13		-10	-10	-10	March 30
MA	-13	-12	-7	-8		-8	52	March 29
GO	-13	-8	-12	-6		-6		March 26
MS	-11	-8	-11		-10			March 31
MG	-11	-12	-13		-8	-7		March 30
PI	-11	-11	-9		-4	10		March 27
PR	-11	-7	-11		-6	-7		March 27
PE	-11	-7	-8		-3	-3		March 25
RN	-10	-10	-14		5		5	March 28
BA	-10	-10	-12		-1	-9		March 29
CE	-10	-7	-10	-6		-3		March 26
SC	-9	-7	-10		-8	-8		March 26
AM	-7	-5	-8		-1	-5		March 24
RJ	-6	-6	-6		-2	-2		March 19
RS	-6	-6	-8	-6		-6	7	March 25
SP	-4	6	0		7		7	March 17

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Note: the color gradient depicts the period of each category's implementation, with the darkest color representing the period 21 to 30 days prior to the first death, followed by 20 to 11 days prior, 10 to 1 days prior, 0 to 10 days after, and more than 10 days after the first death.

1 soon after the implementation of nonpharmacological interventions, but increased to between 1 and 1.3 after the measures were relaxed there [37].

Together with the timing of implementation, the measures' stringency and duration appear to be essential for the intervention's success [11]. The OxCGRT found that by May 30, 2020, most of the 160 countries monitored by the group presented a stringency index for the distancing measures greater than 70 (on a scale of 0-100, where 100 is the most stringent), with Brazil showing an index of 81.02 [30]. This index is also being monitored in Brazil's states and state capitals by the Institute for Applied Economic Research (IPEA) [38], which found that the measures' degree of stringency in Brazilian states and state capitals increased continuously up to March 23-24, 2020, although some states adopted substantially more rigorous policies than others [39], and that the measures' stringency has decreased since early June, with persistent variations between the different states and state capitals [40].

The duration should be long enough to achieve the desired epidemiological effects, causing a minimum of social and economic harms [3] and avoiding the attrition and loss of adherence by the population, as has already been observed in many Brazilian states [40]. From the socioeconomic point of view, a review study has already shown that social distancing, self-isolation, and travel restrictions have resulted in unemployment in many economic sectors, work overload in others, and an increase in cases of domestic violence (physical, emotional, and sexual) [18]. Another study also found that the COVID-19 pandemic is causing additional health problems such as stress, anxiety, depressive symptoms, insomnia, and other mental disorders, even while acknowledging that studies related to COVID-19 and mental health are still scarce [41]. These findings have led some researchers to prefer the term "physical distancing" rather than "social distancing" to emphasize the need for us to remain socially connected, while maintaining physical distancing.

Furthermore, the overly early implementation of social distancing measures may result in their early relaxation at times when epidemiological evidence shows an increase in cases and deaths. The way (and the extent to which) early implementation of social distancing measures impacted the epidemic's progression, and also the possible premature flexibilizations in various states, is something that should be assessed in specific studies for this purpose.

The international literature has proposed the implementation of intermittent strategies with variable periodicities, including restrictions and flexibilizations over time, based on epidemiological indicators. This approach is being considered for the immediate future, until a safe and effective vaccine is available, based on the belief that due to the large number of susceptible individuals, a second wave of SARS-CoV-2 infections is likely [42].

This study has limitations that should be addressed. Since this is a descriptive study, it does not have the potential to verify the effect of distancing measures on the evolution of COVID-19 cases and deaths, but it raises hypotheses that may be validated in subsequent studies. Besides, the survey was conducted in state-level legislation, not at the municipal level, and according to the Supreme Court ruling on April 15, 2020, the municipalities have the autonomy to issue different recommendations from those of the respective state [22]. Another limitation is that we identified the distancing measures issued or recommended by the state legislation, while the actual adherence to these measures cannot be assessed with this study's design.

In conclusion, the current study found that all Brazilian states implemented comprehensive and early social distancing measures in a short space of time, aimed at mitigating the impact of COVID-19. However, the impact of this early implementation on the epidemiological evolution of the disease and possible early flexibilization of these measures with inadequate epidemiological timing is still not clear. This emphasizes the need for constant monitoring, focused on the trends in COVID-19 cases in the states that are already relaxing the measures, in order for the efforts achieved in the mitigation of the disease not to be lost with flexibilization. This also emphasizes the need for administrators to back their decisions on evidence when implementing, relaxing, or reintroducing social distancing measures in each state, as well as society's collaboration in fighting this disease, following the recommendations at the individual, environmental, and community levels.

Contributors

L. L. S. Silva, A. F. R. Lima and D. A. Polli contributed to the data collection and analysis and writing and final revision of the manuscript. P. F. S. Razia and L. F. A. Pavão contributed to the data collection and analysis and final revision of the manuscript. M. A. F. H. Cavalcanti and C. M. Toscano contributed to the research project's intellectual development, validation of the methodology, and writing and final revision of the manuscript.

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Resumo

Medidas de distanciamento social vêm sendo amplamente adotadas para mitigar a pandemia da COVID-19. No entanto, pouco se sabe quanto ao seu impacto no momento da implementação, abrangência e duração da vigência das medidas. O objetivo deste estudo foi caracterizar as medidas de distanciamento social implementadas pelas Unidades da Federação (UF) brasileiras, incluindo o tipo de medida e o momento de sua adoção. Trata-se de um estudo descritivo com caracterização do tipo, momento cronológico e epidemiológico da implementação e abrangência das medidas. O levantamento das medidas foi realizado por meio de buscas em sites *oficiais das Secretarias de Governo e no* Diário Oficial *de cada UF. Os números de casos e óbitos por COVID-19 foram obtidos de uma plataforma de informações oficiais. Consideramos as seguintes categorias de medidas de distanciamento social: suspensão de eventos, suspensão de aulas, quarentena para grupos de risco, paralisação econômica (parcial ou plena), restrição de transporte e quarentena para a população. O momento de implementação considerou a data cronológica e também o momento epidemiológico, levando em conta o tempo após o décimo caso ou primeiro óbito por COVID-19 em cada UF. Todas as UF implementaram medidas de distanciamento, em sua maioria durante a segunda quinzena de março de 2020. Paralisação econômica foi implementada precocemente, anterior ao décimo caso por 67% e anterior ao primeiro óbito por COVID-19 por 89% das UF. As medidas de distanciamento social foram amplamente implementadas no Brasil, de maneira precoce, antes ou na fase inicial da curva de crescimento exponencial de casos e óbitos por COVID-19 na grande maioria das UF.*

COVID-19; Isolamento Social; Epidemiologia

Resumen

Medidas de distanciamiento social están siendo ampliamente adoptadas para mitigar la pandemia de la COVID-19. No obstante, poco se sabe en cuanto al momento de implementación, alcance y duración de la vigencia de las medidas en su impacto. El objetivo de este estudio fue caracterizar las medidas de distanciamiento social, implementadas por las Unidades de la Federación (UF) brasileñas, incluyendo el tipo de medida y el momento de su implementación. Se trata de un estudio descriptivo con caracterización del tipo, momento cronológico y epidemiológico de la implementación y alcance de las medidas. La obtención de las medidas se realizó a través de búsquedas en sitios oficiales de las Secretarías de Gobierno y Boletín Oficial de cada UF. Los números de casos y óbitos por COVID-19 se obtuvieron de una plataforma de información oficial. Consideramos las siguientes categorías de medidas de distanciamiento social: suspensión de eventos, suspensión de clases, cuarentena para grupos de riesgo, paralización económica (parcial o plena), restricción de transporte y cuarentena para la población. El momento de implementación consideró la fecha cronológica y también el momento epidemiológico, considerando el tiempo tras el 10º caso o 1er óbito por COVID-19 en cada UF. Todas las UF implementaron medidas de distanciamiento, en su mayoría durante la segunda quincena de marzo de 2020. Se implementó la paralización económica precozmente, anterior al 10º caso por 67% y anterior al 1er óbito por COVID-19 por 89% de las UF. Las medidas de distanciamiento social fueron ampliamente implementadas en Brasil, de manera precoz, antes o en la fase inicial de la curva de crecimiento exponencial de casos y óbitos por COVID-19 en la gran mayoría de las UF.

COVID-19; Aislamiento Social; Epidemiología