

## Deaths of doctors and nursing staff by COVID-19 in Brazil: a sociological approach

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**Abstract** *The article addresses the most basic nuances and key issues involved in the high mortality of doctors, nurses, technicians and nursing assistants, as a result of COVID-19 in Brazil. This is a study based on data from the Federal Councils of Medicine and Nursing (CFM and Cofen, respectively) and the study on the death inventory of the Oswaldo Cruz Foundation (Fiocruz), and aims to understand and analyze this reality in the light of the sociology of professions. The work makes a relevant and unprecedented contribution to the understanding of the past, present and future of working class segments that work at the bedside, on the front line, providing direct care to patients.*

**Key words** *Death, Medicine, Nursing, COVID-19, Health*

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## Introduction

The severe impact of the SARS-CoV-2 virus on humanity can be measured by the high number of infections and deaths detected worldwide, particularly in Brazil. As of early February 2022, more than 25,800 million cases and around 629,000 deaths caused by COVID-19 were reported. The data express an actual slaughter. The surviving population experienced the bruising pain of a fatal illness, a health catastrophe currently the world's most significant public health problem<sup>1</sup>.

The World Health Organization (WHO) declared the COVID-19 pandemic a Public Health Emergency of International Concern (PHEIC) after confirming cases and deaths on a scale and on all continents<sup>2</sup>. The pandemic has led countries to seek to organize their health systems to mitigate the disease. This effort highlighted the needs and weaknesses of the systems, especially concerning protecting the health and physical integrity of health professionals.

This situation is no different in Brazil. The health professionals' vulnerability derives from work overload, substandard conditions, and difficult access to Personal Protective Equipment (PPE), among other factors related to daily work<sup>3</sup>. As a result, these frontline leaders became even more susceptible to infection, resulting in thousands of removals and deaths due to COVID-19<sup>4</sup>.

The Special Epidemiological Bulletin 22 from the Ministry of Health (MS) describes that COVID-19 has already left an indelible mark among health professionals. The professions most affected at that time were nursing assistants and technicians (62,633, 34.8%), nurses (26,555, 14.7%), doctors (19,858, 11.02%), Community Health Workers (ACS) (8,362, 4.6%), and health facility receptionists (7,856, 4.3%). This Bulletin highlighted that "the data presented on cases and deaths of Severe Acute Respiratory Syndrome (SARS) of hospitalized health professionals reflect a selection of severe cases in these categories and not the total of those affected by the disease in the country"<sup>5</sup>.

Considering the impact of the pandemic on the health workforce around the world, it has become imperative to analyze the working conditions and mental health of these workers in the context of COVID-19 in Brazil. In this sense, the Oswaldo Cruz Foundation (FIOCRUZ) has been conducting national research on the working conditions of these workers, whose preliminary results substantiate critical thinking on the

subject and stimulate new approaches. The study "Death Inventory of health professionals due to COVID-19 in Brazil"<sup>6,7</sup> reveals the sociodemographic profile of the professionals who died the most.

The SARS-CoV-2 virus pandemic has highlighted health professionals for their courage in the face of frontline risks and the high COVID-19 lethality rate among them<sup>8</sup>. Reports on the example of life and deaths of these people have become daily in the primary communication vehicles<sup>9</sup>.

The present study aims to understand and analyze this reality in light of the sociology of professions, using data from two core professional categories in the health system: doctors and nursing staff (nurses and nursing assistants/technicians).

### Medicine and nursing: core health professions – a sociological view

The statement that modern society is a professionalized society means that each service is governed by qualified professionals accredited by the State and professional category bodies. This sociological phenomenon is expressed in these specialized services provided to the population by traditionally accredited professions such as Medicine, Engineering, Law, Nursing, Dentistry, and Psychology. They come to hold recognized cultural authority that establishes exclusive, cognitive, and ethical jurisdictions over broad shades of reality. What is 'disease', 'health', 'sanity', 'mental insanity', 'occupational accident', or 'occupational illness' are issues almost always decided at the institutional level under the technical command of corporations, which is the extraordinary power that professions demand for themselves and that is almost always granted to them by the State and legitimized by society<sup>10</sup>.

In general, any professional activity must have a strong orientation toward providing services to the community. The sense of public and social utility is essential to master a knowledge-knowhow field and the monopoly of praxis. However, one cannot overlook the disputes and competition for these monopolies of knowledge and practices held, almost always, in the legal field. This is called professionalism, which is established as a legal set, exclusive and inseparable from each profession, translated into training curricula, professional regulation laws, and codes of ethics.

Health is a field of knowledge and practice in which the assumptions are considered in the

framework of health professions and services provided to the population. The fact that they established themselves and became cultural authorities on what we should or should not do in cases of diseases, conditions or symptoms, or risks of illness is very relevant. Thus, health professionals are science practitioners who favor scientificity applicable to reality.

Thus, the patient's decision to seek the doctor, the nurse, or the physiotherapist, for example, cannot be imposed on him/her but is induced by the idea of their authority, which is established through the logic of trust and respect. The concept that they do not give orders to the patient, but advise them to adopt the best course of action<sup>11,12</sup> is established within these same parameters.

The sense of professionalized modern society, analyzed by Machado et al.<sup>13</sup> in the field of health, consecrates traditional categories such as doctors and nurses and extends to the growing number of legal processes in the activity of other occupational groups that seek a profession (p. 102). This movement is observed globally and reflects the social need for legitimacy that services in a given technical area have before the State and society.

The founders of the sociology of professions<sup>11-14</sup> agree that two attributes are fundamental: the existence of a specific body of knowledge and orientation towards an ideal of services, as Machado points out<sup>15</sup>.

Conceptualizing it more clearly, we can say that a profession is an occupation whose obligations systematically create and use the general knowledge accumulated in the solution of problems postulated by a client, individual, or group (p. 18).

Larson<sup>16</sup> believes both codes of ethics and the ideal of service, different versions of the same idea of moral obligation to society, are the professions' primary ideological response to the contradiction between socially produced knowledge, on the one hand, and its private appropriation as expertise, on the other. Both justify and guarantee that this knowledge will be returned to society as qualified services (p. 63).

However, the violation of ethical commitments persists as an internal issue of each profession in society, where the clientele is poorly organized and unable to discern what to do, given the monopoly of knowledge and practice of a given profession. On the contrary, we observe movements of informed and organized patients who develop resistance to this authority and specific prescriptions and practices and attempt to partic-

ipate in decisions related to their health and even question them. The pandemic has given many examples of these clashes between knowledge and truth, bumping into the dogmas of professional autonomy and confusing ideological discourses contrasting with scientific research results.

### **Sociological categories to understand the deaths of health professionals**

Two categories define studying and understanding the structure and dynamics of the labor market – age and gender, recognized and essential to studies and practices in the health sector. However, they have specific characteristics among doctors, nurses, and nursing professionals and demarcate different analyses.

#### **Age**

For the sociological analysis of the labor market of health professionals, in particular, Machado<sup>10</sup> offers a categorization called “Professional life stages”, considering age and their entry into the labor market, adapted to the reality of Medicine and Nursing.

Stage 1 – **“Beginning of professional life”** – refers to professionals aged up to 35. This stage includes recent graduates, with up to 12 graduation years. It is when, in general, professionals still do not have a clear definition of the work field and their inclusion in the labor market. It is a time of searching for more specialization and qualification for the services through *lato sensu* or *stricto sensu* postgraduate courses.

Stage 2 – **“Full productive professional life”** – generally includes individuals aged 36-50, with 13-27 graduation years. They are already prepared, qualified, and incorporated into the job market at this stage. Work choices are now guided by rational logic and made with a watchful eye on opportunities. Individuals fully assume their professional life and begin to master their cognitive abilities and skills. They almost always have a specialist certificate and know the work field in which they will establish themselves in the job market. They seek to ensure the best conveniences, with no room for illusions and uncertainties. The daily work assumes prominence and advocates for rational, opportunity-mediated choices.

Stage 3 – **“Selectivity and Deceleration of their professional activities”** – includes individuals aged 51-60 with 27-38 graduation years. At this stage, professional activities decelerate. Choices are driven by desires, what pleases them the most and gives meaning to their actions.

Stage 4 – **“Onset of paralyzing professional activities and retirement”** – includes people aged 61-70, with more than 39 graduation years, actually preparing to withdraw (wholly or partially) from the labor market. This stage witnesses the desire to pursue other creative activities, perform other functions and carry out tasks that provide comfort, pleasure, and personal recognition.

Stage 5 – **“Professional life paralysis”** – includes professionals over 71 about to stop or reduce activities entirely. We should emphasize that the progressive withdrawal from work activities occurs, in general, via retirement among nursing professionals since most are salaried workers with guaranteed retirement rights. However, this movement does not occur among doctors since their work is highly “autonomous” as “independent professionals”. In this way, most choose to work in their field of knowledge and practice until a very advanced age or even die while carrying out their work activities. This situation is increasingly frequent because the independent profession allows doctors to modulate their work, schedules, and clientele. The increased life expectancy, with more and more health and technological support possibilities, corroborates this uninterrupted exercise of work activities.

### Gender

Medicine and Nursing are two professional categories that have historically behaved differently vis-à-vis gender participation in the composition of their workforce. While Medicine has a robust masculine trait, Machado<sup>17</sup> makes an essential reflection on the profession’s feminization process, with the increasing entry of women into the labor market:

The world of medical work is traditionally made up of male professionals. [...] It is only very recently that women have entered this market to work as healers. In Brazil, feminization only occurred from the late 1930s onwards, even then discreetly, gaining momentum only in the following decades. [...] The consolidation of the female workforce in the medical profession derives from the 1970s generation (p. 149).

Scheffer M. *et al.*<sup>18</sup> confirm this change in the study on medical demography:

In 2000, for example, 4,572 men registered with the councils, against 3,594 women – 56% and 44%, respectively. In 2009, female doctors became the majority. Of the total participants that year, 50.4% were women, and 49.6% were men. In 2019, 21,941 new doctors registered, of

which 57.5% were women and 42.5% were men (p. 43).

On the other hand, Nursing is historically a female profession. The Brazilian Nursing Profile Research<sup>19</sup> shows a proportion of 86.2% of women and 13.4% of men among nurses. The proportion is similar in the contingent of assistants/technicians, with 84.7% women and 14.7% men. On the other hand, in the opposite direction, Nursing has been experiencing a clear category ‘masculinization’ process, with increasing men’s entry into the profession.

### COVID-19 deaths among health professionals

#### In the world

Several studies were conducted to assess morbimortality in Health Professionals globally during the COVID-19 pandemic. The first bibliographic “scoping review” survey was conducted with publications available until May 8, 2020, involving 195 countries, 152,888 professionals, and 1,413 deaths. COVID-19 cases occurred mainly in women (71.6%) and nurses (38.6%), while death cases occurred in men (70.8%) and doctors (51.4%). The medical specialties most associated with death were Internal Medicine and Mental Health, but deaths also had primarily administrative staff victims.<sup>20</sup> Deaths among health professionals over 70 arrived at 37.7%. In this first review, Europe had the highest absolute number of COVID-19 cases (119,628) and deaths (712); and the Eastern Mediterranean Region (WHO Classification of Regions)<sup>21</sup> had the highest lethality (5.7%). The authors concluded that cases of infection and deaths of professionals followed the trends of the general population.

Data from China’s National Health Commission reveal that more than 3,300 professionals in that country were infected with SARS-CoV-2<sup>22</sup>. According to WHO data, until April 4, 2020, 23 deaths were reported among the 3,387 COVID-19 cases in Chinese health professionals<sup>23</sup>. The Medscape website, which honors HPs victims of COVID-19, recorded more than 1,800 names from 64 countries until June 3, 2021, 135 in the USA, 109 in Italy, and 84 in Iran. The youngest was 20 years old, and the oldest was 99<sup>24</sup>.

At the beginning of the pandemic, the International Council of Nurses (ICN) warned of the urgent need for countries to standardize effective methods for recording the incidence of infections and deaths of health professionals. However, more must be done in this sense, all over

the world, including Brazil. According to Wang<sup>25</sup>, several factors were associated with the infection. The most significant infection derived from ignorance of the etiological agent and the contagion form, followed by insufficient protective equipment (PPE) to meet the high demand.

An ICN survey based on data from 30 countries and the vast impact in the press indicates that 7% of all COVID-19 cases that occurred up to the date of the study were of health professionals<sup>26</sup>. There was, therefore, a high percentage of these infected workers, which was due, in part, to the lack of PPE, increased working hours, tiredness, stress, and negligent safety measures, topics strongly present in editorials and obituaries<sup>27</sup>. These episodes are recorded in journalism and history as a trace of the high morbimortality that affected the country.

By March 2021, WHO had registered a global total of 108,579,352 cases and 82,404,102 deaths due to COVID-19<sup>28</sup>. In the first three months of 2021, we observed exponential growth of cases in our country, which became the global epicenter of the pandemic, reaching 7,563,551 cases and 192,681 deaths in April 2021<sup>29</sup>. It was the most critical moment of the pandemic: Brazil was ranked second in deaths, concentrating 30% of the global total, trailing only behind the USA<sup>30</sup>. More than 3,000 people died daily, including five health professionals.

The repercussions of this excess of deaths for everyone, but particularly for health professionals, went far beyond the sad direct consequences of SARS-CoV-2 infection. The working and living conditions, work overload, and fragile bonds even had repercussions on mental health. Post-Covid Syndrome required an urgent assessment of the situation.

### **In Brazil**

Brazil has the Unified Health System (SUS), which has more than 200,000 outpatient and hospital units. Approximately 430,000 public beds are available, with a contingent of around four million health workers. Two health professions stand out in the COVID-19 pandemic setting: doctors and nurses and their teams, as the core of care, whether working in hospitals or reference outpatient clinics for the care of those affected by the Coronavirus in all 5,570 municipalities of the five regions of the country<sup>31</sup>. Beside their technical and strategic importance, these two categories add up to more than 2.9 million professionals, representing 72.5% of the country's total Health workforce.

The Federal Council of Medicine (CFM) informs that Brazil had 552,543 doctors in December 2020. Data from the Federal Nursing Council (COFEN) show that Brazil had 582,212 nurses and 1,799,996 nursing assistants/technicians in December 2020, totaling 2,934,751 professionals. These numbers attest to the hegemony and perpetuity of this strategic professional contingent for the SUS, which was essential and indispensable in the pandemic currently plaguing the world and the country. Therefore, based on the sociological theory of professions, this text aims to identify and analyze the situation of the categories with registered deaths from COVID-19. To this end, we adopted information on the deaths of these professionals from CFM and COFEN data.

The databases of these entities were arranged chronologically by month and year of death, with the following common variables: age, gender/sex, federative unit, region, place of residence, and month and year of death. The variables of skin color or ethnicity (available only for nursing) and specialties in which they work (available only for doctors) differ between categories.

We aimed to analyze these two professional contingents separately, preserving the characteristics of each, with differences in nursing between nurses and nursing assistants/technicians. The identity of each person who died was preserved. The data and analyses were arranged so that the secrecy and privacy of each piece of information were ensured.

The study (Guimarães et al., 2021)<sup>6</sup> considered data on COVID-19 deaths from March 2020 to March 2021. It counted 622 doctors, 200 nurses, and 470 nursing assistants/technicians, whose analysis will follow the same logic as the sociological categories discussed earlier: age and gender. Using Machado's<sup>10</sup> construct, referring to the professional life stages, we highlight the distinct and coherent movements in the analyzed professional categories (Table 1).

In Stage 1 – **“Beginning of professional life”** (aged up to 35, with up to 12 graduation years), doctors account for 2.7% of deaths; in Nursing, the percentages are higher in both cases – nurses and nursing assistants/technicians. In Stage 2 – **“Full productive professional life”** (aged between 36-50, with 13-27 graduation years), doctors account for 8.2% of deaths, with 46% among nurses and 40.6% among nursing assistants/technicians. In Stage 3 – **“Selectivity and Deceleration of their professional activities”** (aged 51-60, with 27-38 graduation years), doctors

account for 14.1% of deaths, with 24% among nurses and 27% among nursing assistants/technicians. In Stage 4 – “**Onset of paralyzing professional activities and retirement**” (aged 61-70, with more than 39 graduation years), doctors account for 33.8% of deaths, with 11% among nurses and 15.1% among nursing assistants/technicians. In Stage 5 – “**Professional life paralysis**” (over 71 and in the process of totally paralyzing or reducing activities), doctors account for 41.2% of deaths, with only 2% among nurses and 1.5% of nursing assistants/technicians (Table 1).

Finally, the data show the different behavior of these categories in the world of work and will certainly also determine the composition of deaths by gender.

When analyzing death data by gender, we observed an absolute predominance of men (87.6%) against 12.4% of women in the case of doctors. Among nurses, we identified a rapprochement between genders, with 59.5% women and 40.5% men. A predominance of female deaths (69.1%) against male deaths (30.9%) was observed for nursing assistants/technicians.

The data presented clearly show an absolute (for medicine) and relative (for nursing) predominance of male deaths, which will corroborate, on the one hand, the labor market analysis considering the generational evolution of feminization of the medical profession, as pointed out by Machado in the late 1990s and confirmed by Sheffer in 2020. On the other hand, Machado<sup>19</sup> has been pointing out the generational masculinization and emphasizes that nursing is a historically female profession. However, as already mentioned, it has shown a visible growing process of male presence in recent decades. Therefore, in medicine – the younger the age groups, the greater the presence of women, while the opposite occurs in nursing – the younger the ranges, the more the growing male presence in the profession is reaffirmed (Table 2).

Regarding the correlation between skin color/ethnicity and deaths of nursing professionals: 31% of nurses who died from COVID-19 were white, and 51% black and brown; among assistants/technicians, 29.6% were white, and 47.6% were black and brown. The high “not informed” percentage in both cases stands out (Graph 1). No skin color or ethnicity information from the CFM is available.

## Medical specialties and deaths

The variable ‘specialty’ was made available only by the CFM. Considering the listing of this attribute and the information on the characteristics of doctors<sup>32</sup> who died from COVID-19, 45 specialties and areas of expertise were recorded (Chart 1).

Machado<sup>17</sup> analyses medical specialties using the model by Diaz-Jouanen (1990)<sup>33</sup> and sociologically reclassifies them, considering the nature and work process: a) Cognitive specialties – they deal directly with patients. b) Technical-surgical and skill-related specialties – they also deal directly with the patient; c) Intermediate specialties – they associate technical skills (surgery) with the cognitive base (clinic), intermediating these two distinct areas; d) Technological and bureaucratic specialties. The doctor-patient relationship gives way to the collective relationship, referring to populations or a colleague’s patient requiring some specific test (p.26-27).

A vital record is the range of 45 specialties among doctors who died from COVID-19 (Table 1). Three prominent groups stand out; G1-Cognitive specialties (37.8%), G2-Technical-surgical and Skill-related specialties (22.2%), and G3-Intermediate specialties (22.2%), and with a lower percentage G4-Technological and bureaucratic specialties (17.8%).

On the other hand, Table 3 shows the distribution of these deaths by specialty and points to the ten that accumulated more professional losses, totaling 463 of the 622 registered deaths: gynecology-obstetrics (93), internal medicine (74), pediatrics (61), general surgery (51), orthopedics and traumatology (41), cardiology (36), anesthesiology (28), family and community medicine (24), psychiatry (24), and occupational medicine (21).

The ranking with the ten medical specialties (Graph 2) highlights the importance of fields of care and continuous service to large populations, even in a pandemic. They would only be able to restrict their activities, whether in public/private establishments or even in doctors’ offices, almost always with the necessary biosafety apparatus. Therefore, they were not a priority target of biosafety policies against the pandemic.

The biosafety issue was evident and disseminated in the COVID-19 care reference sites. This is one of the findings of the research on the work-

**Table 1.** Deaths of doctors, nurses, and nursing assistants/technicians due to COVID-19, by age group, Brazil.

Age group	Doctors		Nurses		Nursing assistants/ technicians	
	Absolute value	%	Absolute value	%	Absolute value	%
Up to 25 years	0	0.0	2	1.0	4	0.9
26-35 years	17	2.7	21	10.5	50	10.6
36-50 years	51	8.2	92	46.0	191	40.6
51-60 years	88	14.1	48	24.0	127	27.0
61-70 years	210	33.8	22	11.0	71	15.1
71-75 years	113	18.2	4	2.0	6	1.3
76 years and over	143	23.0	0	0.0	1	0.2
NI*	0	0.0	11	5.5	20	4.3
Total	622	100.0	200	100.0	470	100.0

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (FIOCRUZ, 2021) (press). \* NI = no information.

**Table 2.** Deaths of doctors, nurses, and nursing assistants/technicians due to COVID-19, by gender, Brazil.

Professional category	Male		Female		Total	
	Absolute value	%	Absolute value	%	Absolute value	%
Doctors	545	87.6	77	12.4	622	100.0
Nurses	81	40.5	119	59.5	200	100.0
Nursing assistants/ technicians	145	30.9	325	69.1	470	100.0

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (FIOCRUZ, 2021) (press).

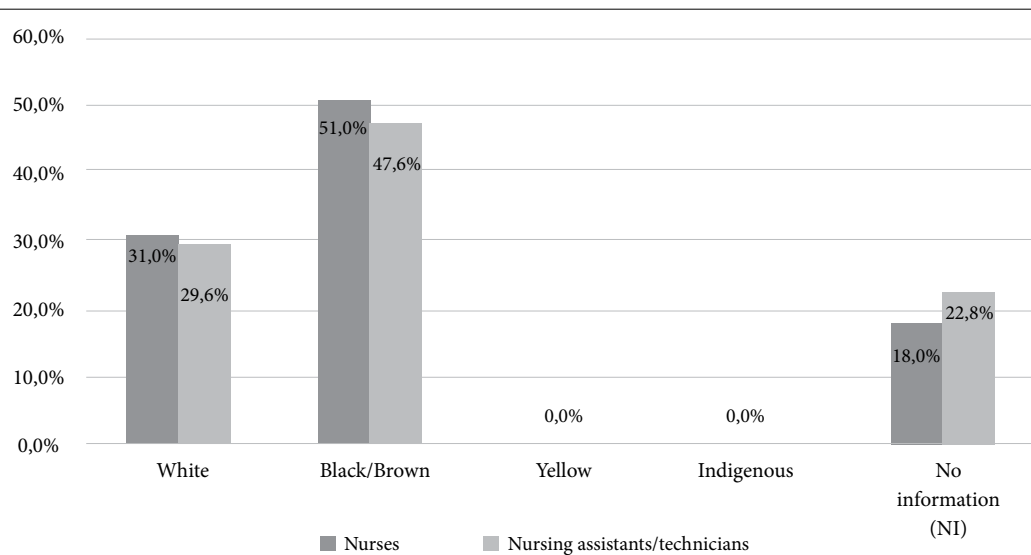
ing conditions of health professionals during the COVID-19 pandemic conducted by FIOCRUZ (2020-2021), which points out the maternity wards, emergency care, UPAS, and all PHC in which professionals referred to as places where this pandemic biosafety did not make them feel insecure when providing care. We are talking about gynecologists and obstetricians in maternity hospitals, pediatricians working in institutions specializing in the child population or even general practitioners, family and community doctors in primary care, surgeons, anesthesiologists, and orthopedists in surgical blocks in general.

### Deaths in regions and states

Regarding the incidence of deaths in the federative regions and units, we should correlate

the number of professionals existing locally and the registered losses. According to CFM (2021) and COFEN (2021) data, the North has only 4.5%, 7.6%, and 8.7% of the number of doctors, nurses, and nursing assistants/technicians in the country. However, professional losses were high, 16.1%, 29.5%, and 23.2%, respectively (Table 4 and Graph 3). A similar behavior occurred in the Midwest, where a contingent of doctors (8.6%), nurses (8.8%), and nursing assistants/technicians (7%) were registered, while the deaths of these professionals exceeded 10.6%, 16.0%, and 14.9%, respectively. The Northeast showed a balance between the existing and the loss of professionals; the region has 18.5% of doctors, 26.2% of nurses, and 22.4% of nursing assistants/technicians in the country. It recorded 27.2%, 19.5%, and 16.8% of deaths. The South is the smallest region in the country, with only three states. It has more proportional percentages. While it holds 15.3% of doctors, 12.3% of nurses and 13.1% of nursing assistants/technicians, the deaths of these professionals were 11.4%, 8.5%, and 13%, respectively. With superlative figures in the composition of the contingent of professionals, the Southeast boasts more than half (53%) of the country's doctors, 45.1% of nurses, and 48.9% of nursing assistants/technicians. However, when it comes to losses due to the pandemic, the percentages are proportionally lower: 34.7%, 26.5%, and 32.1%, respectively.

Again, regarding the data referring to the states (Table 4), three stand out in terms of doctors' deaths: Rio de Janeiro (15.8%), São Paulo (11.3%), and Pará (10.1%). The state of Pará is responsible for 63 of the 100 deaths in the North, and Rio de Janeiro and São Paulo account for 168



**Graph 1.** Deaths of nurses and nursing assistants/technicians due to COVID-19, by ethnicity or skin color, Brazil.

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (Fiocruz, 2021).

**Chart 1.** Classification of medical specialties by medical deaths due to COVID-19 Brazil\*\*\*.

Group 1	Group 2	Group 3	Group 4
Cognitive	Technical-surgical and skill-related	Intermediate	Technological and bureaucratic
Angiology	Head and neck surgery	Acupuncture	Health administration*
Cardiology	General surgery	Anesthesiology	Cytopathology*
Medical clinic	Pediatric surgery	Coloproctology	Emergency medicine
Endocrinology and metabolism	Plastic Surgery	Dermatology	Traffic medicine
Generalist**	Thoracic Surgery	Gastroenterology	Legal medicine and medical expertise
Geriatrics	Vascular Surgery	Gynecology and obstetrics	Preventive and social medicine
Hematology and hemotherapy	Mastology	Ophthalmology	Pathology
Homeopathy	Nephrology	Orthopedics and traumatology	Radiology and diagnostic Imaging
Infectology	Neurosurgery	Otorhinolaryngology	
Family and community medicine	Clinical Oncology	Urology	
Occupational medicine			
Intensive care medicine			
Neurology			
Pediatrics			
Pneumology			
Psychiatry			
Rheumatology			
17 specialties	10 specialties	10 specialties	8 specialties
(37.8%) of the 45 specialties.	(22.2%) of the 45 specialties	(22.2%) of the 45 specialties	17.8% of the 45 specialties

\* Area of medical performance; \*\* doctors without specialties recognized by the CFM; \*\*\* NI (no information) specialty were excluded.

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (Fiocruz, 2021). Chart adapted from Machado MH, editor. Os médicos no Brasil – um retrato da realidade. Rio de Janeiro: Fiocruz; 1997.



**Table 3.** Medical deaths due to COVID-19 by medical specialty, Brazil.

Specialty	Absolute value	%
Acupuncture	3	0.5
Health administration*	1	0.2
Anesthesiology	28	4.5
Angiology	4	0.6
Cardiology	36	5.8
Head and neck surgery	1	0.2
General surgery	51	8.2
Pediatric surgery	2	0.3
Plastic surgery	5	0.8
Thoracic surgery	1	0.2
Vascular surgery	3	0.5
Cytopathology*	1	0.2
Medical clinic	74	11.9
Coloproctology	1	0.2
Dermatology	4	0.6
Endocrinology and metabolism	7	1.1
Gastroenterology	6	1.0
Generalist**	2	0.3
Geriatrics	2	0.3
Gynecology and obstetrics	93	15.0
Hematology and hemotherapy	3	0.5
Homeopathy	2	0.3
Infectology	4	0.6
Mastology	1	0.2
Emergency medicine	8	1.3
Family and community medicine	24	3.9
Traffic medicine	2	0.3
Occupational medicine	21	3.4
Intensive care medicine	12	1.9
Legal medicine and medical expertise	5	0.8
Preventive and social medicine	1	0.2
Nephrology	1	0.2
Neurosurgery	11	1.8
Neurology	8	1.3
Ophthalmology	18	2.9
Clinical oncology	2	0.3
Orthopedics and traumatology	41	6.6
Otorhinolaryngology	3	0.5
Pathology	1	0.2
Pediatrics	61	9.8
Pneumology	7	1.1
Psychiatry	24	3.9
Radiology and diagnostic imaging	14	2.3
Rheumatology	4	0.6
Urology	8	1.3
NI***	11	1.8
Total	622	100.0

\* Area of medical performance; \*\* doctors without specialties recognized by the CFM; \*\*\* NI (no information) specialty were excluded.

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (Fiocruz, 2021). Chart adapted from Machado MH, editor. Os médicos no Brasil – um retrato da realidade. Rio de Janeiro: Fiocruz; 1997.

of the 216 deaths in the Southeast. Concerning nurses, the three highlighted states are Amazonas (12.5%), São Paulo (10.5%), and Rio de Janeiro (9.5%). Twenty-five of the 59 deaths registered in the North are in the state of Amazonas, while the states of Rio de Janeiro and São Paulo account for 40 of the 53 deaths in the Southeast. As for nursing assistants/technicians, São Paulo (15.7%), Rio de Janeiro (9.4%), and Amazonas (9.1%) stand out as the ones with the most losses of these professionals. Seventy-four of the 151 deaths in the Southeast were from São Paulo, and 43 of the 109 deaths from the North were from Amazonas.

The polarization of the states of the region with the largest contingents in the country is noteworthy in the ranking of deaths of these three professional categories, in contrast to the states of the region – North with the smallest contingents of professionals in the country, further exacerbating regional inequalities.

Several studies on the labor market<sup>34-36</sup> have pointed to the poor distribution of the Health Workforce in the country, uncovering a deep structural inequality, leading to severe shortages of professionals in some states in the North and Northeast. The regional concentration observed since the 1980s and 1990s, still persistent in the 2000s, influences the labor market since most professionals work in large urban centers in the country's most developed regions, says Machado 2008 (p. 314)<sup>37</sup>.

In the timeline, the highest frequency of deaths among doctors occurred between May and August 2020 (16.9%, 10.6%, 10.9%, and 10.1%, respectively), with a decline in the following three months (September (6.4%), October (3.1%), and November (6.1%)). This situation was soon reversed, in December 2020, to mid-year levels (10%) (Graph 4). Deaths of nurses occurred between April and June 2020 (12.5%, 13.5%, and 12.5%, respectively), with a decline between July and December of the same year, and a new increase occurred from January 2021, reaching 11% in February. Nursing assistants/technicians' deaths were higher in May 2020 (16.4%), followed by April (12.1%), July (11.7%), and August (10%). A decline was observed from September to December 2020, followed by an increase in the first three months of 2021: January (7.9%), February (7.2%), and March (9.1%).

According to updated data from CFM and COFEN, until October 2021, 893 doctors<sup>38</sup> and 873 nursing professionals – 617 assistants/technicians and 256 nurses – had already died across the country<sup>39</sup>.

## Final notes

In the novel *The Plague*, published in 1947, the writer Albert Camus tells the story of a small town shaken by the arrival of a lethal pandemic, highlighting the isolation of the population, the exposure of health professionals, the hesitation of the authorities in the face of the challenging situation, misinformation and the bureaucratization of information about deaths caused by the plague. After 70 years, current journalistic editorials on the COVID-19 pandemic in Brazil show that reality is identified with Camus' fiction.

According to the WHO, by May 2021, at least 115,000 health professionals had died from COVID-19 worldwide. The editorials indicate that this number should be even higher, given the underreporting trend observed in several parts of the globe. In Brazil, this situation is confirmed since figures on infected people and deaths among health workers are not systematized. There are a few exceptions. CFM and COFEN have counted the number of professionals killed by COVID-19 since the onset of the pandemic.

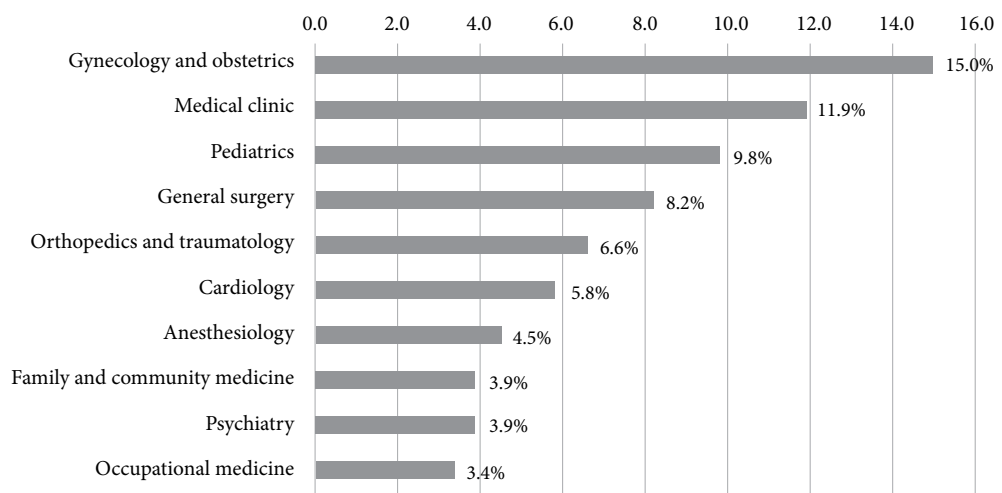
The present study highlights some findings: a) doctors working in primary specialties were the hardest hit in the pandemic, causing significant deaths. They were primarily men above 60. It is necessary to deepen this discussion to cor-

relate available biosafety with the profile of these professionals who work in these areas, which is a turning point and crucial reflection; b) nursing professionals who were victims of COVID-19 and died were women, black and brown, aged up to 60; c) four states in two regions were the most affected by professional losses – Pará and Amazonas (North) and Rio de Janeiro and São Paulo (Southeast).

The research conducted at FIOCRUZ on the working conditions of health workers during the pandemic has shown that most people's lives have deteriorated, bringing panic and the constant threat of death from infection.

We should also point out that, due to institutional policy issues, the country currently lacks safe and stable sources to determine the extent of the devastation of those infected and dead among the population and the professionals. However, post-COVID-19 sequelae are already observed among workers. They will impact the institutional routine due to the volume of removals due to sequelae, which would require resizing this contingent of doctors, nurses, and nursing technicians/assistants.

Misinformation is also a crucial factor in this context of suffering for the professionals discussed here, as false news is an obstacle in the fight against the proper and adequate treatment



**Graph 2.** Ranking of the 10 specialties with the highest rate of doctor's deaths due to COVID-19, Brazil.

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (FIOCRUZ, 2021).

**Table 4.** Deaths of doctors, nurses, and nursing assistants/technicians due to COVID-19, by location (region/federation unit), Brazil.

Region/federation unit	Doctors				Nurses				Nursing assistants/technicians			
	Total	%	Deaths	%	Total	%	Deaths	%	Total	%	Deaths	%
Brazil	552,543	100.0	622	100.0	582,212	100.0	200	100.0	1,799,996	100.0	470	100.0
North region	24,932	4.5	100	16.1	44,148	7.6	59	29.5	156,512	8.7	109	23.2
Rondônia	3,244	0.6	10	1.6	4,603	0.8	7	3.5	13,968	0.8	28	6.0
Acre	1,083	0.2	3	0.5	2,618	0.4	2	1.0	5,978	0.3	10	2.1
Amazonas	5,519	1.0	11	1.8	11,984	2.1	25	12.5	38,487	2.1	43	9.1
Roraima	965	0.2	2	0.3	1,765	0.3	3	1.5	7,291	0.4	4	0.9
Pará	9,754	1.8	63	10.1	14,576	2.5	11	5.5	65,723	3.7	10	2.1
Amapá	1,100	0.2	3	0.5	2,783	0.5	10	5.0	11,520	0.6	10	2.1
Tocantins	3,267	0.6	8	1.3	5,819	1.0	1	0.5	13,545	0.8	4	0.9
Northeast region	102,458	18.5	169	27.2	152,612	26.2	39	19.5	402,976	22.4	79	16.8
Maranhão	7,970	1.4	23	3.7	14,973	2.6	2	1.0	44,557	2.5	9	1.9
Piauí	5,564	1.0	11	1.8	7,200	1.2	3	1.5	16,474	0.9	2	0.4
Ceará	16,317	3.0	6	1.0	24,948	4.3	8	4.0	58,246	3.2	18	3.8
Rio Grande do Norte	7,070	1.3	18	2.9	9,874	1.7	1	0.5	29,243	1.6	3	0.6
Paraíba	8,723	1.6	36	5.8	14,328	2.5	4	2.0	28,715	1.6	7	1.5
Pernambuco	20,712	3.7	32	5.1	26,998	4.6	7	3.5	86,099	4.8	27	5.7
Alagoas	5,794	1.0	12	1.9	8,030	1.4	4	2.0	21,306	1.2	4	0.9
Sergipe	4,711	0.9	6	1.0	6,620	1.1	1	0.5	19,227	1.1	2	0.4
Bahia	25,597	4.6	25	4.0	39,641	6.8	9	4.5	99,109	5.5	7	1.5
Southeast region	292,942	53.0	216	34.7	262,815	45.1	53	26.5	879,951	48.9	151	32.1
Minas Gerais	59,744	10.8	16	2.6	52,348	9.0	11	5.5	145,845	8.1	26	5.5
Espírito Santo	11,636	2.1	HN32	5.1	9,638	1.7	2	1.0	34,435	1.9	7	1.5
Rio de Janeiro	67,621	12.2	98	15.8	57,372	9.9	19	9.5	239,847	13.3	44	9.4
São Paulo	153,941	27.9	70	11.3	143,457	24.6	21	10.5	459,824	25.5	74	15.7
South region	84,687	15.3	71	11.4	71,389	12.3	17	8.5	235,017	13.1	61	13.0
Paraná	30,033	5.4	44	7.1	27,843	4.8	5	2.5	82,460	4.6	29	6.2
Santa Catarina	20,385	3.7	22	3.5	16,057	2.8	6	3.0	48,651	2.7	16	3.4
Rio Grande do Sul	34,269	6.2	5	0.8	27,489	4.7	6	3.0	103,906	5.8	16	3.4
Midwest region	47,524	8.6	66	10.6	51,248	8.8	32	16.0	125,540	7.0	70	14.9
Mato Grosso do Sul	6,962	1.3	6	1.0	7,785	1.3	2	1.0	18,346	1.0	17	3.6
Mato Grosso	7,030	1.3	24	3.9	9,959	1.7	14	7.0	21,412	1.2	26	5.5
Goiás	17,097	3.1	32	5.1	16,962	2.9	8	4.0	46,266	2.6	16	3.4
Federal District	16,435	3.0	4	0.6	16,542	2.8	8	4.0	39,516	2.2	11	2.3

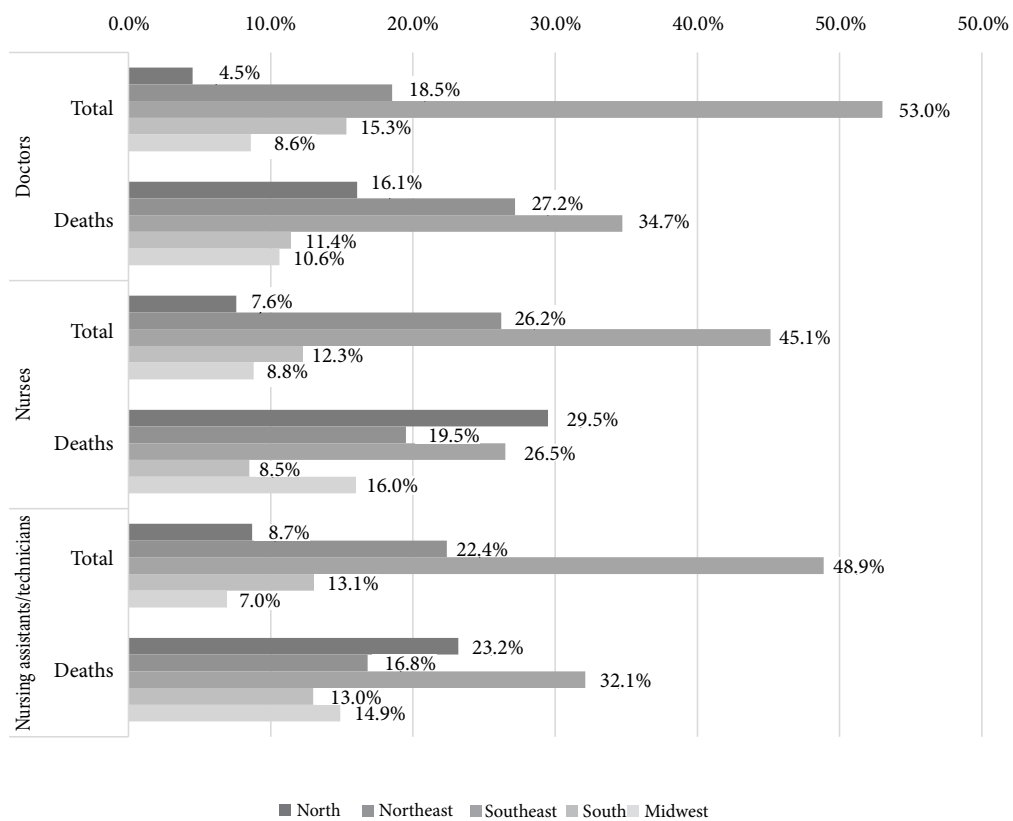
Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (FIOCRUZ, 2021) (press).

of the new Coronavirus, especially when it leads the population to discredit the vaccine and believe in miraculous cures and ineffective medications.

It is necessary to seek definitive solutions to the severe issue: the daily vulnerability of health professionals is generated chiefly by the overload and substandard work conditions and the difficult access to sufficient Personal Protective Equipment (PPE). Thus, these frontline lead-

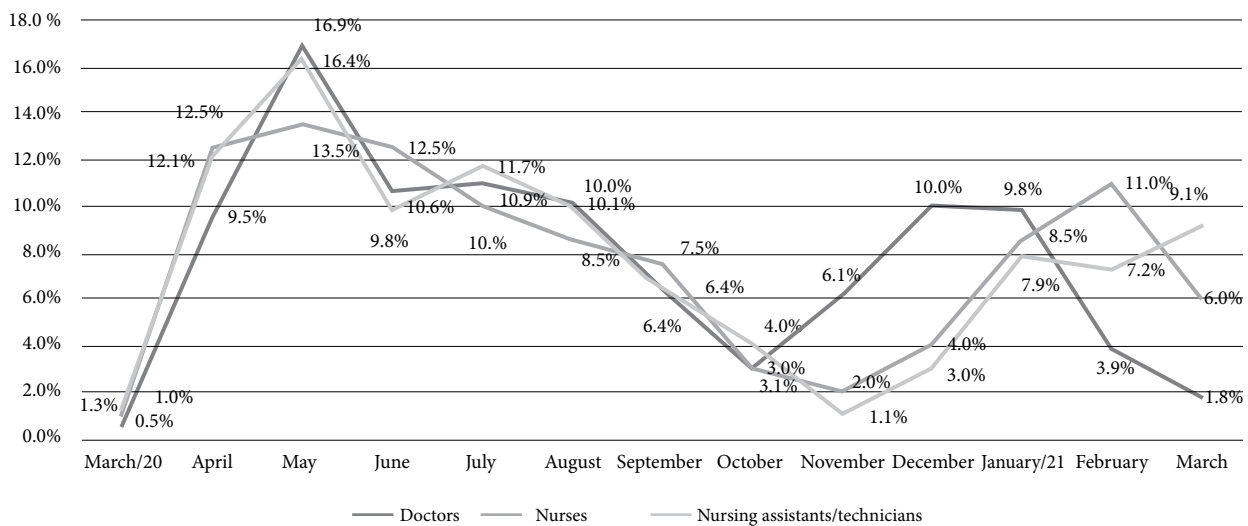
ing figures became even more susceptible to infection, resulting in thousands of removals and deaths due to COVID-19.

Finally, we should stress that the scarcity and sometimes systematic lack of data on the deaths of health professionals in general during the pandemic is a serious issue. It implies a blackout about facts that happened and are happening to these workers, generating a setting of uncertainty in the pandemic and post-pandemic.



**Graph 3.** Deaths of doctors, nurses and nursing assistants/technicians due to COVID-19, according to location (region/unit of the federation), Brazil.

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (FIOCRUZ, 2021).



**Graph 4.** Deaths of doctors, nurses, and nursing assistants/technicians, by month of death, Brazil.

Source: Special tabulations (CFM and COFEN, Mar.2021). Elaborated: Inventory of deaths of Health Professionals due to COVID-19 in Brazil (FIOCRUZ, 2021).

## **Collaborations**

MH Machado, EG Teixeira, NP Freire, EJ Pereira, and MCS Minayo participated in the conception and design of the study, writing and reviewing the intellectual content until the final version of the manuscript.

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