Profile and essentiality of Nursing in the context of the COVID-19 pandemic

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Abstract The present study aims to describe the sociodemographic and health profile of nursing professionals in the context of the COVID-19 pandemic and propose a reflective analysis on the essentiality of the category facing the intrinsic demands of patients and the Brazilian health system, especially in the context of the public health emergency triggered by the exponential advance of the SARS-CoV-2 virus. This study reveals the relationship between historical injustices and the different types of inequality that impacted and caused the vulnerability of the profession, with an emphasis on the presentation of potential perspectives arising from this historical process and recent events.

Key words *Demography, Working Conditions, Nurse Practitioners, COVID-19*

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Introduction

Nursing accounts for approximately 59% of the healthcare workforce¹ and is an essential profession for the operation of public, private, and philanthropic healthcare systems. The essentiality of nursing stems from the indispensability of nurses, nursing technicians, and nursing assistants, working daily in the healthcare network, a labor locus in which the minimum conditions for the development of decent work in human healthcare must be conceived in order for the paradigm of essentiality to prevail, based on human dignity, on the valuation of the worker, and contractual work relations².

Nursing is a predominantly female profession, although it has been undergoing a process of masculinization over the past three decades. Data from the Federal Nursing Council (*Conselho Federal de Enfermagem* - Cofen)³, show that there are currently 450,770 nursing assistants; 1,611,639 nursing technicians; and 670,581 professional nurses registered in Brazil. Among these workers, 85.1% declare themselves to be female, while 14.1 declare themselves to be male. Approximately 50% of this contingent has worked in the frontline during the public health crisis resulting from the COVID-19 pandemic.

In Brazil, the nursing workforce is concentrated in large urban centers, with 56.8% of workers employed in the 27 state capitals and their metropolitan areas, and 40.9% employed in the over five thousand cities around the country³. Given its demographics, nursing, better than any other profession, represents how women have been treated in both the labor market and society throughout history⁴. These are people exposed to miserable wages, exhausting hours, unjust periods of rest, prejudice, moral and sexual harassment, precarious transportation, insecurity, violence, and an overload with home and family responsibilities⁵. As in teaching, gender inequalities are obvious.

Double employment is a reality imposed by low wages on professionals in this sector. Working in two or more health units makes earning a decent salary possible. The study, *Profile of Nursing in Brazil*⁶, shows that at least 25% of the category work two jobs. Pressured by low wages, another significant portion of the categories that make up the nursing class is pushed towards informality, having to do "odd jobs" and "extra activities" to survive, such as nanny services, caregiver for older people, beauty salon work, housekeeping, civil construction services, private security guards, delivery services, among others.

The work overload of nursing professionals is a brutal reality and is present in 75,000 health-care facilities in the public sector and 60,000 in the private sector⁷. In general terms, the life of a nursing professional in this space is divided into four stages: the beginning of professional life – up to 25 years of age; the stage of professional training – between 26 and 35 years of age; professional maturity – between 36 and 50 years of age; and the phase defined as "professional slowdown" – between 51 and 60 years of age³.

According to official metrics, 59.3% of all nursing teams work in the public sector, 31.8% in the private sector, 14.6% in the philanthropic sector, and 8.2% in teaching activities8. Due to low wages and exhausting working hours, only 40% of the people who make up the nursing teams could take on some form of professional training after graduation. This scenario can favor the stagnation of professionals, who tend to remain attached to their careers for fear of losing rights and benefits, with no prospect of professional growth and development9. Conversely, in a clear demonstration of resilience, approximately 30% of the nursing assistants and technicians attended graduation to become a nurse. In the same sense, the absolute majority (85%) want to continue their studies to reach a higher level, demonstrating great commitment to their career^{6,10}.

Nevertheless, the pursuit, mastery, and monopoly of knowledge bring nursing closer and closer to autonomy and social prestige⁷. Despite the barriers, the profession broke with the history of philanthropic and religious assistance provided to the sick, at *Santas Casas de Misericórdia* (Catholic charity hospitals), and became professional. The charitable and altruistic image associated with nurses has become a thing of the past. Today, the activity combines the sociological elements that project its future: self-knowledge, a vast job market, and social recognition⁴.

During the pandemic, Brazilian nurses cared for 34 million patients infected with COVID-19, applied 519 million vaccines against the disease, and comforted hundreds of thousands of COVID-19 patients, of which 680,000 died¹¹. This work retrieved and enhanced the narrative of heroism¹², to the point that people went to their windows to applaud the work of brave professionals who risk their lives in the frontline, without protection, yet with exceptional courage¹³. As never before, nursing became the object of editorials and starred in reports in the media. Category representatives were invited to give their opinion on public health problems¹⁴. Thus,

nursing professionals' history and demands were at the center of the national political debate¹⁵. However, despite the narrative, the pandemic revealed to society that, behind the hero's esthetic, there is a category that is tired, exploited, and exposed to the risks of an inhuman healthcare system, with no respect for safety and health rules or the human aspects of work processes. According to official data, in Brazil, COVID-19 infected 64,629 nursing professionals and killed 872 of them¹⁶. One out of every three nursing professionals who died of COVID-19 died in Brazil¹⁷. The country accounts for 3% of the world's population and 11% of total deaths caused by the new coronavirus¹⁸. This was an unprecedented tragedy, which reveals the level of precarious health to which nursing professionals are subjected.

During the COVID-19 pandemic, 60% of Brazilian nursing professionals experienced a lack of institutional support to cope with the disease; 21% felt devalued by their bosses; 40% experienced some type of violence in the workplace; 33.7% suffered discrimination in their own neighborhoods; and 27.6% were victims of discrimination on the way between home and work, as people believed that the worker carried the virus and, therefore, represented a walking risk. As a consequence, 15.8% of the professionals declared that they suffered from sleep disturbances, 13.6% reported irritability and frequent crying, 11.7% said they were unable to relax and felt stressed, 9.2% had difficulty concentrating or slow thinking, 9.1% reported losing pleasure in their careers or lives, 8.3% reported a negative feeling about the future and negative or suicidal thoughts, and 8.1% faced appetite or weight changes19.

During the pandemic, Cofen received 6,200 complaints about the precarious working conditions of nursing professionals in the care of COVID-19 cases and, through the Regional Nursing Councils (COREN), supervised 8,674 healthcare facilities²⁰. Cofen dealt with a sanitary storm driven by experimental guidelines drawn from rudimentary knowledge. The situation changed into a scenario that exacerbated inequalities and showed that we were not all in the same boat. This metaphor makes it clear that the most fragile vessels are those that take healthcare professionals in the frontline²¹. This is evidenced by the fact that, in nursing teams, 65.9% of people claim they suffer from burnout, mainly due to an overload of responsibilities.

Living with pain, suffering, and illness, as well as with poor working conditions, has led to

a bleak outlook. Only 34% of nursing professionals exercise throughout the week; that is, 66% are declared sedentary. One-fourth of the category has comorbidities, such as hypertension, obesity, lung diseases, depression, and diabetes, and more than 70% show signs of extreme exhaustion, in addition to physical and psychological sequelae resulting from the pandemic⁴. Strictly speaking, they are individuals who are prevented from leading a healthy life.

In this scenario, the studies: "Healthcare professionals' work conditions in the Covid-19 scenario in Brazil"²² and "Invisible healthcare workers: work conditions and mental health in the Covid-19 scenario in Brazil"²³, whose unpublished results subsidize this work and will be demonstrated below, present revealing data on the situation of the profession in Brazil and make a relevant contribution to the advancement of knowledge on the conditions of the largest healthcare workforce in the country, Nurses.

In view of the above, this study aimed to describe the sociodemographic and health profile of nursing professionals in the context of the COVID-19 pandemic.

Method

This is a descriptive study, with a cross-sectional outline, built from data obtained in studies "Healthcare professionals' work conditions in the Covid-19 scenario in Brazil"²² and "Invisible healthcare workers: work conditions and mental health in the Covid-19 scenario in Brazil"²³, coordinated by the Center for Strategic Studies of the Oswaldo Cruz Foundation's National School of Public Health (CEE/ENSP/FIOCRUZ). These two studies originated from a nationwide matrix project and counted on the participation of 8,897 professional nurses and 11,469 nursing assistants and technicians, respectively.

The nursing professionals in the study sample worked in the frontline of the fight against the COVID-19 pandemic in public and private health institutions in 2,200 cities across the country. The studies were made public on social media and institutional contacts by the national and regional entities that bring together healthcare workers, including the Federal Nursing Council and the Regional Nursing Councils.

The research database consisted of an online questionnaire containing closed-ended questions, applied between June and December 2020, using the Research Electronic Data Capture (RedCap) platform. Responses were received and stored on Fiocruz's Scientific and Technological Communication and Information Institute (Instituto de Comunicação e Informação Científica e Tecnológica em Saúde - ICICT) server. Data were analyzed by the Microsoft Excel and Microsoft SQL Server programs.

The studies used non-probabilistic sampling, the snowball model, starting from the social media of the actors involved to access the group that constituted the target audience of each study so that the choice of participants did not follow a random template. The questionnaire was applied for self-completion and free sharing, and data analysis was performed using descriptive statistical methods.

The matrix project, coordinated by Fiocruz, was approved by the Research Ethics Committee under No. 4.081.914 (CAAE No. 32351620.1.0000.5240).

Results

This study included a sample of 20,393 nursing professionals, of which 8,897 (43.6%) were professional nurses who had participated in the study "Healthcare professionals' work conditions in the Covid-19 scenario in Brazil"²², and 11,496 (56.4%) were nursing technicians and assistants that had participated in the study "Invisible healthcare workers: work conditions and mental health in the Covid-19 scenario in Brazil"²³.

As shown in Table 1, these professionals are distributed throughout the country, with both professional nurses (45.1%) and nursing assistants and technicians (33.9%) being predominantly based in the Southeast region. There was a lower concentration of nurses in the North region (7.6%) and of nursing assistants and technicians in the Midwest region (8.1%). A concentration of professionals working in the capitals of the Brazilian states stands out: professional nurses (40.8%) and nursing assistants and technicians (38.0%), while in cities in interior regions: professional nurses (39.6%) and nursing assistants and technicians (37.5%).

According to the demographic profile (Table 2), most of the professionals who participated in the study were female (professional nurses: 84.3%; nursing assistants and technicians: 83.1%), with a concentration of professionals in the professional maturity phase (36 to 50 years of age), followed by those in the professional training phase (26 to 35 years of age), with 48.2% and

35.1% of professional nurses, respectively, and 48.5% and 29.3% of nursing assistants and technicians. Regarding color/race, most professional nurses were white (51.6%). Among nursing assistants and technicians, there was a predominance of people of mixed race (46.2%).

As shown in Table 3, the work profile showed that, in the COVID-19 pandemic scenario, most nursing professionals worked from 21 to 40 hours a week (53.2% of professional nurses and 50.2% of nursing assistants and technicians). Notably, however, 30.9% of professional nurses and 29.1% of nursing assistants and technicians worked between 41 and 60 hours a week. These results show more than one employment relationship among nursing professionals participating in the studies.

The hospital system constituted the main group of healthcare facilities in which nursing professionals worked during the COVID-19 pandemic: 56.2% of professional nurses and 65.2% of nursing assistants and technicians worked in hospitals.

Despite the role of nursing in coping with the COVID-19 pandemic, professionals who worked in the frontline were at risk of contamination. It was observed that 24.4% of professional nurses (2,173 workers) claimed to have received a positive diagnosis for COVID-19. Among nursing assistants and technicians, this percentage was 38.5% (4,418 workers) (Figure 1).

Many nursing professionals who worked on the frontline in the fight against COVID-19 had pre-existing diseases, which may constitute a risk factor for the increase in the severity of the disease and death. The study shows that approximately one-fourth of professionals claimed to have pre-existing conditions, including high blood pressure (26.4% professional nurses; 29.6% nursing assistants and technicians), obesity (18.6% professional nurses; 16.4% nursing assistants and technicians), and pulmonary diseases (15.7% professional nurses; 15.9% nursing assistants and technicians) (Table 4).

Discussion

The results of this study express the profile of Brazilian nursing in the context of the COVID-19 pandemic and denote that these professionals were essential for the health care of people affected by the disease. They also point out that the distribution of nursing professionals in the different regions follows the spatial distribution of the population, with a greater concentration

Table 1. Distribution of nursing professionals, according to region of Brazil and place of work. Brazil, 2020-2021.

Variables	Nurses (n=8,897)*	Nursing Aids and Technicians (n=11,469)** n (%)	
	n (%)		
Region of Origin			
North region	675 (7.6)	1,672 (14.6)	
Northeast Region	2,332 (26.2)	2,620 (22.8)	
Southeast region	4,016 (45.1)	3,891 (33.9)	
South region	1,091 (12.3)	2,255 (19.7)	
Midwest region	783 (8.8)	925 (8.1)	
Did not answer	-	106 (0.9)	
Place of work			
Capital	3,626 (40.8)	4,353 (38.0)	
Metropolitan region	1,360 (15.3)	2,341 (20.4)	
Countryside	3,527 (39.6)	4,300 (37.5)	
Did not answer	384 (4.3)	475 (4.1)	

Table 2. Demographic profile of nursing professionals. Brazil, 2020-2021.

Variables	Nurses (n=8,897)*	Nursing Aids and Technicians (n=11,469)** n (%)	
	n (%)		
Sex			
Male	1,378 (15.5)	1,904 (16.6)	
Female	7,496 (84.3)	9,533 (83.1)	
Did not answer	22 (0.3)	32 (0.3)	
Age Range			
Less than 25 years	437 (4.9)	1,217 (10.6)	
26-35 years	3,121 (35.1)	3,356 (29.3)	
36-50 years	4,287 (48.2)	5,557 (48.5)	
51-60 years	947 (10.6)	1,192 (10.4)	
Over 61 years	100 (1.1)	135 (1.2)	
Did not answer	4 (0.04)	12 (0.1)	
Color or Race			
White	4,592 (51.6)	4,555 (39.7)	
Black	701 (7.9)	1,297 (11.3)	
Yellow	180 (2.0)	235 (2.0)	
Brown	3,389 (38.1)	5,300 (46.2)	
Indigenous	20 (0.2)	56 (0.5)	
Did not answer	15 (0.2)	26 (0.2)	

Source: Research "Working Conditions of Health Professionals in the Context of COVID-19 in Brazil" - ENSP-CEE/Fiocruz, 2020/2021, and Research "Invisible health workers: working conditions and mental health in the context of COVID-19 in Brazil" - ENSP-CEE/Fiocruz, 2021/2022.

in the Southeast region, the most developed region with the greatest availability of healthcare resources and services in the country²⁴. This disparity in the distribution of nursing professionals may have intensified in the COVID-19 pandemic scenario, due to the availability of resources, with

a more substantial impact on the economically more vulnerable population²⁵.

It is not objectively about decentralizing the healthcare system nor about the division of federal, state, and municipal responsibilities in achieving low, medium, and high-complexity

Table 3. Work profile of nursing professionals. Brazil, 2020-2021.

Variables	Nurses (n=8,897)*	Nursing Aids and Technicians (n=11,469)** n (%)
	n (%)	
Work shift (weekly workload)		
Less than 20 hours	137 (1.5)	417 (3.6)
21-40 hours	4,737 (53.2)	5,753 (50.2)
41-60 hours	2,750 (30.9)	3,334 (29.1)
61-80 hours	884 (9.9)	1,104 (9.6)
More than 80 hours	315 (3.5)	713 (6.2)
Did not answer	74 (0.8)	148 (1.3)
Type of Establishment		
Public hospital	3,091 (34.7)	4,495 (39.2)
Private Hospital	1,067 (12.0)	1,827 (15.9)
Philanthropic Hospital	513 (5.8)	747 (6.5)
Campaign Hospital	329 (3.7)	413 (3.6)
Emergency Care Unit	539 (6.1)	672 (5.9)
Mobile Emergency Care Service (SAMU)	229 (2.6)	312 (2.7)
Primary Health Care Units	2,198 (24.7)	1,858 (16.2)
Polyclinic/Clinic/Specialized Center	331 (3.7)	424 (3.7)
Remote Service	77 (0.9)	92 (0.8)
Long Stay Facility for the Elderly	44 (0.5)	53 (0.5)
Administrative services	218 (2.4)	43 (0.4)
Teaching and Research Institution	53 (0.6)	12 (0.1)
Audit/Expertise Services	1 (0.01)	-
Autonomous Activity	2 (0.02)	20 (0.2)
Therapeutic Diagnostic Support Service (SADT)	28 (0.3)	53 (0.5)
Military/Security Area	10 (0.1)	25 (0.2)
Prison System (socio-educational system)	22 (0.2)	18 (0.2)
Trade/Industry	43 (0.5)	102 (0.9)
Private office	11 (0.1)	23 (0.2)
Drug store	-	4 (0.03)
Oil Services	3 (0.03)	6 (0.1)
Provision of Home Services/Home care	-	134 (1.2)
Funeral Service/Cemetery	-	1 (0.008)
Patient/ambulance removal	-	10 (0.1)
Others	43 (0.5)	64 (0.6)
Did not answer	46 (0.5)	61 (0.5)

services to citizens²⁶. If that were the case, the system would work equally and universally, regardless of regional disparities, as provided for in the constitution. In a literal expression of reality, we are dealing with inequality stipulated mainly by the economic bias of a country marked by structural inequalities that date back to the colonial period, with a deep stratification of classes²⁷.

Indeed, these asymmetries in the distribution of the nursing workforce reflect and represent the social and economic inequalities of Brazilian society²⁸. More specifically, they essentially represent the difficulties and prejudices faced by women in the pursuit of social ascension, financial emancipation and professional independence^{29,30}. Stifled by low wages, a significant number of professionals are forced to keep more than one job, in addition to still being responsible for domestic and maternal chores. It is no exaggeration to say that these workers face triple shifts, with no due recognition and appreciation³¹, and even in the face of these difficulties, they engage in their

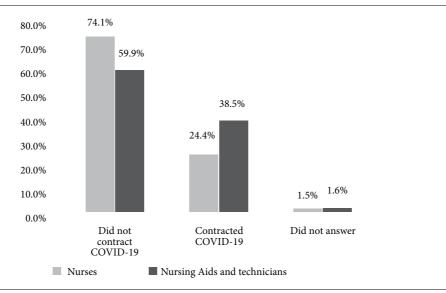


Figure 1. Distribution of nursing professionals, according to the diagnosis of COVID-19. Brazil, 2020-2021.

work and demonstrate energy, resilience, and enthusiasm, strengthening their commitment to their careers^{9,32,33}.

In the meantime, the hypothesis is corroborated that nursing is discriminated against, subjugated, and deprived of fundamental rights, since it consists mostly of women. The sexism impregnated in society is reproduced in labor relations in healthcare services and causes the sedimentation of a culture based on patriarchy, which subordinates women and promotes the unfair division of labor^{30,34}.

At the same time, men who exercise the profession are not in a comfortable position either. The study results indicate that, all things considered, they are also affected by the prejudice that outlines Brazilian society. Thus, they also become ill because of social injustices and excessive responsibility, adopting a sedentary life due to a lack of time and resources for leisure and physical activities³⁵.

Inequalities affect all aspects of gender issues; the nursing profession is no exception. Most white people are graduates (professional nurses), while most mid-level workers (technicians and assistants) are declared black or brown. Centuries of slavery has led to racism and the establishment of unequal levels of access to education and a career in nursing, demonstrating how racial and social relations have been reproduced up to

the present³⁶. In addition, working 41 to 60 hours a week in healthcare facilities – as approximately one-third of Brazilian nursing professionals do – and remaining fully healthy is impossible³⁷. Long working hours associated with high levels of occupational stress generate psychological illness in nursing professionals³⁸⁻⁴⁰. In addition, dealing with others' pains, with the chance of becoming infected, with the risk of becoming ill, and with the overload of responsibilities led these individuals to face a damaged life with no margin and room for self-care and self-knowledge⁴¹.

Despite the visibility and recognition achieved by nursing after the COVID-19 pandemic, these factors have yet to make the reality of the category better, at least for now⁴². Except for the advancement of wage floor regulation, sought for at least three decades, there is no promising discussion in progress about the necessary reduction of the workload to 30 hours a week⁴³, nor has there been a reduction in the risks involved in the exercise of professional activity. This is reflected in the increase in stress and the prevalence of pre-existing diseases, such as hypertension, obesity, and lung diseases, manifesting as risk factors for death in different contexts and scales, mainly due to infections and work-related accidents^{26,38,44}.

In general, the situation of nursing directly impacts the quality of care offered to users of healthcare services. Demanding quality and not

Table 4. Clinical profile of nursing professionals, according to presence of a pre-existing disease. Brazil, 2020-2021

Variables	Nurses (n=8,897)* n (%)	Nursing Aids and Technicians (n=11,469)** n (%)
Presence of pre-existing disease		
Yes	2,087 (23.5)	2,720 (23.7)
No	6,791 (76.3)	8,717 (76.0)
Did not answer	19 (0.2)	32 (0.3)
Pre-existing disease	n=3,096	n=3,968
Arterial hypertension	818 (26.4)	1,173 (29.6)
Obesity	577 (18.6)	650 (16.4)
Lung diseases (respiratory, asthma, bronchitis, bronchiectasis)	485 (15.7)	630 (15.9)
Depression/Anxiety	328 (10.6)	408 (10.3)
Diabetes Mellitus	266 (8.6)	386 (9.7)
Cardiovascular diseases	126 (4.1)	187 (4.7)
Autoimmune diseases (collagenosis)	125 (4.0)	97 (2.4)
Arthropathy/Discopathies (arthrosis, herniated disc, prosthesis)	47 (1.5)	68 (1.7)
Neoplasms	27 (0.9)	26 (0.7)
Chronic kidney diseases	24 (0.8)	49 (1.2)
Hematological diseases (anaemia, coagulopathies)	23 (0.7)	26 (0.7)
Metabolic diseases (<i>dyslipidemia</i> , <i>cholesterol</i>)	23 (0.7)	7 (0.2)
Neurological diseases (Transient Ischemic Attack, Stroke, labyrinthitis, neuropathy, migraine)	17 (0.5)	24 (0.6)
AIDS	16 (0.5)	21 (0.5)
Infectious diseases (Zika, Chagas, Tuberculosis, Chikungunya)	11 (0.4)	23 (0.6)
Allergic diseases	15 (0.5)	11 (0.3)
Pregnant/Puerperal/Lactating	17 (0.5)	11 (0.3)
Immunosuppression	17 (0.5)	4 (0.1)
Vascular diseases	7 (0.2)	15 (0.4)
Genetic diseases	1 (0.03)	-
Thyroid Diseases	-	74 (1.9)
Diseases of the Digestive System	-	23 (0.6)
Eye Diseases	-	3 (0.1)
Smoking/Alcoholism	-	17 (0.4)
Others	126 (4.1)	35 (0.9)

providing the required investment is not reasonable. Any self-respecting solution should not be restricted to inputs and technologies but must also reach the human sphere of work processes, as it is impossible to achieve better rates in the providing of care and not tend to the urgent needs of these workers, who still seem to have a long road ahead.

The situation presented by this study is not recent, but it accumulates aggravating factors over time. The ills that affect the category and the tra-

jectory of the nursing struggle for rights, recognition, and better working conditions have been a hundred-year reality in Brazil. It dates back to 1926, when graduates of the Nursing School of the National Department of Public Health (current Anna Nery Nursing School, UFRJ), dissatisfied with their work conditions, began to organize themselves politically to expose the hardships of the profession⁴⁵. Since then, this process has intensified to the point of becoming a latent issue in the public debate.

Nursing professionals are the backbone of the Brazilian healthcare system. Evidently, all workers in the multidisciplinary team are essential for the functioning of healthcare facilities. However, nursing is the category closest to patients. It is defined as essential in pain care, the administration of medication, therapy management, the search for human comfort, immunization of the population, and the management of life and death, which are core activities of those who work in the segment.

Conclusion

The results of this study allow one to outline some aspects related to the profile of nursing, in the COVID-19 pandemic scenario, such as the predominance of female professionals, with an age corresponding to the stages of training and professional maturity; heterogeneous distribution of professionals in the national territory, with a higher number in the Southeast region; concentration of professionals working in state capitals and hospital units; the presence of more than one employment relationship; and many professionals with pre-existing diseases, especially systemic arterial hypertension, obesity, and lung disease.

By profiling the category, this study contributes to the definition of public policies and adequate approaches to the need for these professionals in the country, primarily concerning the most vulnerable segments of the population. The World Health Organization (WHO) advocates that being healthy does not mean being free of disease, but having living conditions that guarantee physical, mental, and social well-being, including access to healthcare services, the guarantee of which depends on the appreciation of nursing professionals.

Healthcare conditions in Brazil were unfavorable, and the COVID-19 pandemic aggravated this. The lack of protective equipment, the shortage of professionals, low wages, exhausting hours, and the high rate of illness and death among our nursing colleagues have shaken foundations that were already fragile. From this perspective, nursing has been plagued by practically insurmountable difficulties over the past three years; at the same time, it gained public respect in society, given the number of editorials and tributes rendered to the category during this period.

However, the tributes did not translate into better working and living conditions for nurses, nursing assistants, and technicians, at least in the short run, as evidenced by the data in this study. Thus, overcoming this reality and building a better future for nursing and healthcare involves meeting the demands expressed in the aforementioned research coefficients, which reveal essential information for the scientific and political understanding of the subject.

Collaborations

BMP Santos, AMF Gomes, LG Lourenção and NP Freire contributed to the concept and development of the study, data collection, acquisition, and interpretation, writing and final approval of the article. ICKO Cunha, AJCA Cavalcanti, MCN Silva and D Lopes Neto contributed to the writing and final approval of the article.

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