

Prevalence of testing and coronavirus-19 among nurses in the pandemic

Prevalência de testagem e coronavírus-19 entre enfermeiros na pandemia

Prevalencia de pruebas y coronavirus-19 entre enfermeros en la pandemia

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ABSTRACT

Objective: To determine the prevalence of testing and COVID-19 among nurses during the pandemic in the State of Ceará. **Method:** A cross-sectional study with 379 nurses, through a network sampling technique, using a sociodemographic, labor, and clinical questionnaire. The study performed a descriptive statistics, univariate and multivariate logistic regression analysis. **Results:** The prevalence of testing and COVID-19 were, respectively, 63.3% and 25.0%. The most common symptoms were anosmia, ageusia, and myalgia. There was inadequate use of personal protective equipment due to material shortage. The odds ratio for COVID-19 was higher in those with children, people with diabetes, from the capital, with more than two jobs, in hospital and emergency room, and from the frontline. In the multivariate logistic regression, nurses with children ($p=0.011$), diabetics ($p=0.018$) and frontline ($p<0.001$) had more chances for COVID-19. **Conclusion:** Expanded testing, ongoing in-service education, and adequate personal protective equipment are needed to improve nurses' work. **Descriptors:** Coronavirus Infections; COVID-19; Nursing; Prevalence; Pandemics.

RESUMO

Objetivo: Determinar a prevalência de testagem e COVID-19 entre enfermeiros, durante a pandemia no estado do Ceará. **Método:** Estudo transversal com 379 enfermeiros, com técnica de amostragem em rede, utilizando-se questionário sociodemográfico, laboral e clínico. Realizou-se estatística descritiva, análise de regressão logística univariada e multivariada. **Resultados:** A prevalência de testagem e COVID-19 foram, respectivamente, 63,3% e 25,0%. Sintomas mais comuns foram anosmia, ageusia e mialgia. Referiu-se uso inadequado de equipamentos de proteção individual por escassez de material. A razão de chances para COVID-19 foi maior naqueles com filhos, diabéticos, da capital, com mais de dois empregos, em hospital e pronto atendimento e da linha de frente. Na regressão logística multivariada, tiveram mais chances para COVID-19, os enfermeiros com filhos ($p=0,011$), diabéticos ($p=0,018$) e da linha de frente ($p<0,001$). **Conclusões:** Ampliação da testagem, educação permanente em serviço e equipamentos de proteção individual adequados são necessários para melhorar o trabalho dos enfermeiros.

Descritores: Infecções por Coronavírus; COVID-19; Enfermagem; Prevalência; Pandemias.

RESUMEN

Objetivo: Determinar prevalencia de testeo y COVID-19 entre enfermeros, durante la pandemia en el estado de Ceará. **Método:** Estudio transversal con 379 enfermeros, con técnica de muestreo por redes, utilizándose encuesta sociodemográfica, laboral y clínica. Realizada estadística descriptiva, análisis de regresión logística simple y múltiple. **Resultados:** La prevalencia de testeo y COVID-19 fueron, respectivamente, 63,3% y 25,0%. Síntomas más comunes fueron anosmia, ageusia y mialgia. Referido uso inadecuado de equipos de protección individual por escasez de material. La razón de probabilidades para COVID-19 fue mayor en aquellos con hijos, diabéticos, de la capital, con más de dos empleos, en hospital y servicios médicos de urgencia y de primera línea. La regresión logística múltiple, tuvieron más probabilidades para COVID-19, enfermeros con hijos ($p=0,011$), diabéticos ($p=0,018$) y de primera línea ($p<0,001$). **Conclusiones:** Ampliación de testeo, educación permanente en servicio y equipos de protección individual adecuados son necesarios para optimización laboral de enfermeros.

Descriptor: Infecciones por Coronavirus; COVID-19; Enfermería; Prevalencia; Pandemias.

INTRODUCTION

The COVID-19 pandemic has led to a global economic slowdown, the collapse of the health system in some countries, and has negatively interfered with people's physical and mental health⁽¹⁾. In January 2021, Brazil was the third country in the world in the number of COVID-19 cases (8,075,998), behind only India (10,450,284) and the United States of America (22,192,842)⁽²⁾. So far, 345,211 cases and 10,237 deaths were confirmed in the state of Ceará⁽³⁾.

The pandemic has restructured public and private health services. Elective consultations, examinations, and non-emergency procedures gave way to the care of patients with COVID-19, changing the regular health follow-up of others and the work routine of health professionals⁽⁴⁾. In this critical situation, health professionals are the ones who have the most contact with COVID-19 patients, as they are involved in diagnosis, treatment, and rehabilitation. Nurses have high exposure to the virus because their work involves direct care to patients, and specific protocols are needed in health institutions to reduce the risk of infection during interactions with patients⁽⁵⁾.

In addition, there is a high workload, lack of personal protective equipment (PPE), and specific medications, in addition to the feeling of inadequate support that can contribute to the mental burden of health professionals. These individuals fear the infection of family members, feel uncertainty, and suffer stigmatization, with reports of stress, anxiety, depression, burnout, addiction, and post-traumatic stress disorder, which may have long-term psychological implications⁽⁶⁻⁸⁾.

For nurses working in intensive care in the COVID-19 pandemic, the main stressors are anxiety regarding work environments and processes, lack of experience with infectious diseases, concern about being infected, high workload, fatigue, and depression due to the unsuccessful cure of critical patients, in addition to the concern for their families⁽⁷⁾. Nurses also need to wear a set of protective clothing, keeping their breathing limited to some extent. When dressed up, they do not drink water or go to the toilet, making the work difficult. The longer the weekly working time, the greater the physical and mental consumption, which may interfere with self-care⁽⁸⁾.

Some vaccines against COVID-19 were authorized in December 2020 for emergency use in many countries, starting in Brazil in January 2021 for health professionals and subsequently for other priority groups and the general population. Although vaccines can help put an end to the pandemic, they will not solve everything quickly since, as the COVID-19 crisis continues, protective measures are still needed to prevent the proliferation of the virus and its variants^(2,4,8).

Nurses are exposed to the new coronavirus (SARS-CoV-2) within health institutions by providing direct and continuous care to patients. Therefore, the follow-up of these professionals should also take place in their workplaces through testing, appropriate use of quality PPE, infection control practices, and updated conduct and psychological support⁽⁵⁻⁸⁾. Therefore, this study is proposed due to changes and the negative impact of the COVID-19 pandemic on the health system in Brazil and worldwide, as well as changes in the work dynamics of nurses, who work for long periods exposed to the virus and have work overload.

OBJECTIVE

To determine the prevalence of testing for SARS-CoV-2 and COVID-19 among nurses during the pandemic in the state of Ceará.

METHODS

Ethical aspects

The study was conducted under Resolution 466/2012 of the National Health Council. It followed the preservation, protection, and safety measures for research participants in virtual environments of the National Research Ethics Committee. All nurses signed the Informed Consent Form. The Research Ethics Committee of the Federal University of Ceará approved the project.

Design, period and place of study

This is a cross-sectional study conducted in the State of Ceará, Brazil, from June to December 2020. The research took place according to the guidelines for observational studies: Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)⁽⁹⁾.

Population or sample; criteria of inclusion and exclusion

The sample should estimate the prevalence of nurses with COVID-19, having 95% confidence that the estimation error did not exceed 5%, considering that such prevalence was unknown in the population (stipulated at 50% for providing a larger sample size) and that in the state of Ceará had 22,992 nurses registered with the regional Nursing Council in May⁽¹⁰⁾. Thus, the study applied the expression:

$$n = \frac{z^2 \cdot p \cdot (1-p) \cdot N}{\epsilon^2 \cdot (N-1) + z^2 \cdot p \cdot (1-p)}$$

In this formula, z^2 is equal to the value of the statistic z (1.96) for the degree of confidence adopted (95%), and p , N , and ϵ they correspond to the presumed prevalence (0.50), population (22,992), and tolerable error (0.05), respectively. The survey calculated a sample of 379 nurses. The research adopted the technique of non-probability network sampling, in which individuals selected nominate others to participate. It is used for samples that may be difficult to access otherwise and was very useful given the social isolation and restricted access to health services in the pandemic of COVID-19. Inclusion criteria: nurses of both sexes, with registration in the regional Nursing Council of Ceará and access to the internet, computer, or smartphone. Exclusion criteria: work outside the state of Ceará.

Study protocol

The research invited nurses to participate by email and WhatsApp application. The message sent contained research link, study description, ethics committee approval, consent form, and questionnaire on the Google platform.

The sociodemographic, labor, and clinical questionnaire contained the variables: age, sex, marital status, number of children and people at home, chronic disease, training time, occupational

situation, the city where they worked, employment relationship, place, and sector of work, use of PPE, care for patients with COVID-19, test for SARS-CoV-2, result and symptoms. The average participation time ranged from 10 to 20 minutes. Before the study, 30 nurses that did not compose the sample responded to the research link and questionnaire for pilot test and validation.

Analysis of results and statistics

The study calculated the mean, standard deviation (SD), absolute and relative frequency. A univariate logistic regression analysis evaluated the association between variables and the occurrence of COVID-19 – according to RT-PCR (Reverse Transcription - Polymerase Chain Reaction) and serology for SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) tests results. The strength of association was measured by the odds ratio, accuracy (95% confidence interval), and significance of the estimate (Wald test). Explanatory variables related to the occurrence of COVID-19, with a significance level of 10% ($p < 0.10$), were selected for multivariate logistic regression to identify those associated with the evaluated outcome.

The study used the step-by-step method stepwise and backward, as it was a criterion for removing variables from the model defined by the Wald test. Such analysis determined the adjusted odds ratio, accuracy (95% confidence interval), and significance of the estimate (Wald test). Two-tailed tests were used, with a significance level of 0.05 (5%), considered statistically significant $p < 0.05$. It used the IBM SPSS Statistics v. 23.0 software.

RESULTS

The mean age of the 379 nurses was 36 years (SD: ± 9.3), and most were less than 45 years old (314; 82.8%). As for the performance, 262 (69.1%) worked in the State capital, 103 (27.1%) in the countryside, 14 (3.6%) were unemployed, and 333 (87.8%) had graduate degrees. Eighty-one nurses reported inadequate use of PPE (21.4%), which occurred due to insufficient supply in the service or poor quality. See Table 1.

Of the 379 nurses, 240 were tested for COVID-19, and 95 were positive, with testing and COVID-19 prevalence in the sample, respectively, 63.3% and 25.0%. Most performed serological tests for analysis of IgM and IgG antibodies. See Table 2.

Among the 95 nurses with positive testing for SARS-CoV-2, only 93 showed signs and symptoms. The others ($n = 147$) went under testing without symptoms because they were in contact with people with COVID-19 or by the practice of testing health professionals at work. Table 3 shows the signs and symptoms of the nurses.

In the univariate logistic regression analysis, nurses with children were 1.9 times more likely ($p = 0.018$) to have COVID-19 than those without children. People with diabetes were 5.74 times more likely ($p = 0.032$) than non-diabetics; capital workers were 1.64 times more likely ($p = 0.098$) than those from inland regions; those with two or more jobs were 1.68 times more likely ($p = 0.053$) than those with one job. Hospital or emergency room nurses were 1.66 times more likely ($p = 0.059$) than those in Primary Care; nursing, intensive care, or emergency workers were 1.67 times more likely ($p = 0.058$) than those in primary care. Those who provided direct care to patients with COVID-19 were 4.52 times more likely

($p = 0.001$) than those not active on the frontline of the fight against the pandemic. Among the nurses who took the test, four were unemployed and did not participate in the univariate analysis ($n = 236$). See Table 4.

Table 1 – Sociodemographic, labor, and clinical characterization of nurses during the COVID-19 pandemic, Fortaleza, Ceará, Brazil, 2020 (N = 379)

Variables	n	%
Sex		
Male	48	12.6
Female	331	87.4
Marital status		
No partner (single, separated, widowed)	170	44.8
Married/stable union	209	55.2
Children		
Yes	193	51.0
No	186	49.0
Number of persons in the household		
≤ 3 persons	244	64.4
> 3 people	135	35.6
Systemic arterial hypertension		
Yes	32	8.5
No	347	91.5
Diabetes mellitus		
Yes	12	3.2
No	367	96.8
Graduation time		
≤ 10 years	238	62.8
> 10 years	141	37.2
Occupational situation		
Assets	365	96.4
Unemployed	14	3.6
Employment links		
≥ 2 jobs	134	35.5
1 job	231	60.9
Unemployed	14	3.6
Workplace		
Hospital/emergency unit	177	46.7
Basic health unit	188	49.7
Unemployed	14	3.6
Sector of work		
Infirmary/intensive care/emergency	173	45.6
Primary Care	192	50.8
Unemployed	14	3.6
Proper use of personal protective equipment		
Yes	284	75.0
No	81	21.4
Unemployed	14	3.6
Care for patients with COVID-19		
Yes	253	66.8
No	112	29.6
Unemployed	14	3.6

Table 2 – SARS-CoV-2 test results of nurses in the pandemic. Data expressed as absolute and relative frequency, Fortaleza, Ceará, Brazil, 2020 (N = 379)

Variables	n	%
SARS-CoV-2 test results		
Positive	95	25.0
Negative	145	38.4
Did not go under test	139	36.6
Test type for SARS-CoV-2		
RT-PCR	76	20.0
Serology	164	43.4
Did not go under test	139	36.6

SARS-CoV-2 – Severe Acute Respiratory Syndrome Coronavirus; RT-PCR – Reverse Transcription Polymerase Chain Reaction.

Table 3 – Signs and symptoms of nurses who tested positive for SARS-CoV-2, Fortaleza, Ceará, Brazil, 2020

Signs and symptoms	n	%
Fever		
Yes	45	48.4
No	48	51.6
Cough		
Yes	56	60.3
No	37	39.7
Coryza		
Yes	56	60.3
No	37	39.7
Anosmia		
Yes	62	66.7
No	31	33.3
Ageusia		
Yes	59	63.5
No	34	36.5
Dyspnea		
Yes	29	31.2
No	64	68.8
Chest pain		
Yes	34	36.6
No	59	63.4
Myalgia		
Yes	71	76.4
No	22	23.6
Adynamia		
Yes	72	77.5
No	21	22.5
Diarrhea		
Yes	44	47.4
No	49	52.6

Table 4 – Univariate logistic regression for the association between sociodemographic, labor and clinical variables of nurses and occurrence of COVID-19, by detection of SARS-CoV-2 by RT-PCR or serology, Fortaleza, Ceará, Brazil, 2020

Variables	Test for SARS-CoV-2				Odds ratio	Confidence interval 95%	p value (Wald test)
	Positive		Negative				
	n	%	n	%			
Sex							
Female	78	37.8	128	62.1	0.61	0.28-1.31	0.207
Male	15	50.0	15	50.0	1		
Age							
> 45 years	16	41.0	23	58.9	1.08	0.54-2.18	0.821
≤ 45 years	77	39.0	120	60.9	1		
Marital status							
No partner	35	34.3	67	65.6	0.68	0.40-1.17	0.163
Married/stable union	58	43.2	76	56.7	1		
Children							
Yes	57	46.7	65	53.2	1.90	1.12-3.23	0.018
No	36	31.5	78	68.4	1		
Persons in the household							
> 3 people	33	41.7	46	58.2	1.16	0.67-2.01	0.598
≤ 3 persons	60	38.2	97	61.7	1		
Training time							
≤ 10 years	58	37.6	96	62.3	0.81	0.47-1.40	0.453
> 10 years	35	42.6	47	57.3	1		
Hypertension							
Yes	8	36.3	14	63.6	0.87	0.35-2.16	0.759
No	85	39.7	129	60.2	1		
Diabetes mellitus							
Yes	7	77.7	2	22.2	5.74	1.17-28.26	0.032
No	86	37.8	141	62.1	1		
City where you work							
State Capital	70	42.9	93	57.0	1.64	0.91-2.93	0.098
Countryside	23	31.5	50	68.4	1		

To be continued

The study selected the variables that had significance in the univariate analysis, according to Wald test, less than 0.10 ($p < 0.10$) for multivariate logistic regression. Just having children, diabetes *mellitus*, and providing direct care to patients with COVID-19 were independent factors associated with COVID-19 in nurses. People who had children were 2.12 times more likely than those without children. People with diabetes were 8.61 times more likely than non-diabetic people, but with a broad confidence interval due to the low frequency of this condition in the cohort studied. Frontline nurses were 5.71 times more likely than others (Table 5).

DISCUSSION

Most of the nurses in the study were female, under 45 years of age, with 36 years being the average age, agreeing with other research that evaluated health professionals in the COVID-19 pandemic⁽¹¹⁻¹³⁾. Regarding age, this can occur because people with comorbidities and the elderly have more risks for complications and mortality from the new coronavirus⁽¹¹⁾; and, in some health services, these individuals are removed from usual activities and redirected to other functions⁽¹⁴⁾.

As for the occupational situation, the majority were employed, working in primary, secondary and tertiary care — health workers active in the direct care of patients with COVID-19 are called “frontline professionals” and are more exposed to infection⁽¹³⁾. Most had a post-graduate degree, emphasizing the importance of progress for the labor market. However, in the context of COVID-19, research has shown that, although most professionals know the transmission of infectious diseases and safe work practices, there are still deficits in the subject, mainly because it is a new disease, with daily scientific discoveries⁽¹⁵⁾.

Table 4 (concluded)

Variables	Test for SARS-CoV-2				Odds ratio	Confidence interval 95%	p value (Wald test)
	Positive		Negative				
	n	%	n	%			
Employment relationship							
≥ 2 jobs	47	46.5	54	53.4	1.68	0.99-2.86	0.053
1 job	46	34.0	89	65.9	1		
Workplace							
Hospital/UPA	54	45.3	65	54.6	1.66	0.98-2.82	0.059
Primary care	39	33.3	78	66.6	1		
Sector of work							
Inf./ICU/Emergency	56	45.1	68	54.8	1.67	0.98-2.83	0.058
Primary Care	37	33.0	75	66.9	1		
Use of personal protective equipment							
No	11	32.3	23	67.6	0.70	0.32-1.51	0.365
Yes	82	40.5	120	59.4	1		
Covid-19 care							
Yes	87	44.3	109	55.6	4.52	1.82-11.26	0.001
No	6	15.0	34	85.0	1		

UPA – Emergency Care Unit; INF – Infirmary; ICU – Intensive Care Unit.

Table 5 – Factors associated with COVID-19 in nurses, as tested for SARS-CoV-2, after control of confounding variables. Multivariate logistic regression to determine adjusted odds ratio, accuracy, and significance of the estimate, Fortaleza, Ceará, Brazil, 2020

Variables	Univariate analysis	Multivariate analysis		p value (Wald test)
	Gross odd ratio	Adjusted odds ratio	Confidence interval 95%	
Children				
Yes	1.90	2.11	1.19-3.74	0.011
No	1	1		
Diabetes disease				
Yes	5.74	8.61	1.44-51.54	0.018
No	1	1		
City where you work				
Capital	1.64	1.77	0.95-3.32	0.073
Countryside	1	1		
Employment links				
≥ 2 jobs	1.68	1.33	0.75-2.36	0.334
1 job	1	1		
Workplace				
Hospital/UPA	1.66	1.09	0.58-2.05	0.788
Others	1	1		
Working sector				
Inf./ICU/Emergency	1.67	1.71	0.95-3.06	0.073
Others	1	1		
Covid-19 care				
Yes	4.52	5.71	2.15-15.17	< 0.001
No	1	1		

UPA – Emergency Care Unit; INF – Infirmary; ICU – Intensive Care Unit.

In pandemics, protocols and constant updates are needed in health institutions to reduce the risk of infection among workers⁽⁵⁾. In another study, which evaluated health professionals' knowledge, attitude, and practice, 89% had sufficient knowledge about COVID-19, more than 85% feared infection, and 89.7% followed biosecurity practices. Time of experience, professional category, working hours, educational level, and being on the frontline influenced these questions⁽¹⁵⁾.

Most nurses acted directly with patients with COVID-19, but some did not use PPE adequately due to insufficient supply in the service or poor quality. In the initial phase of the pandemic, the number of health professionals and PPE was scarce, and long working hours left the professionals physically and mentally exhausted — a scenario that can be repeated with the second

wave of COVID-19 and new strains. The recommendation is the use quality PPE, have sufficient rest for adequate sleep, avoid overwork, diet, and supplements for proper nutrition and increased immunity, aimed at reducing the chances of infection⁽¹⁶⁾.

The study also shows that nurses need resilience, support from the employer, staff, and the attendees through actions and resources. Recognition actions that are carried out in Europe aim to keep the spirits up, and nurses are moved by the recognition of gratitude and donations so that their work is performed safely. Nurses need to feel that their needs are met, that their leaders and institutions care for them, and that they wear appropriate PPE as the pandemic spreads. Resilience should not be seen as only individual responsibility but also collective and organizational⁽¹⁷⁾.

However, strict biosecurity measures can be stressful for healthcare professionals⁽¹⁸⁾. Research pointed out the most common discomforts among nurses who wear PPE are sweating when wearing surgical masks (50.9%) or N95 (64.2%), dry hands by constant washing and wearing gloves (73.9%), sweating when wearing overalls/aprons

(84.1%), vision problems and headache when wearing goggles/face protectors (47.9%). There was a relationship between more than four hours of PPE use and the occurrence of redness on the face, nasal bridge and ears, dry mouth, dry hands, headache, and sweating. The availability and safety of PPE are crucial for the protection of nurses, so research is needed to examine the quality and effectiveness of these materials to keep the workforce healthy in the pandemic⁽¹⁹⁾.

The prevalence of testing for SARS-CoV-2 and COVID-19 in nurses was, respectively, 63.3% and 25%, mainly using serology. Therefore, a systematic review with meta-analysis identified that the tests most performed among health professionals were serology and RT-PCR. However, the rate of screening and infection by SARS-CoV-2 were lower than those in the present study,

being, respectively, 11% and 7%⁽¹²⁾. Other studies with health professionals identified COVID-19 prevalence of 4.04%⁽²⁰⁾ e 6%⁽²¹⁾.

The higher the exposure to the virus, the higher the likelihood of infection and the consequences are changes in schedule and work overload⁽²⁰⁾. Research shows that these professionals have more stress, work overload, fatigue, and fear^(7,18). PPE is essential for these professionals. Another study showed that the detection of antibodies to SARS-CoV-2 was lower in health professionals who used face coverings in care compared to those who did not use it. However, the shortage of PPE is a usual report, especially of N95 masks⁽²¹⁾. Few studies include only nurses, but most of the surveys with health professionals show that those most affected by COVID-19 are nurses⁽¹²⁾. As for the work sector, the majority of those affected worked in infirmaries, having a significantly higher seroprevalence than the frontline professionals, perhaps because they used fewer PPE at work^(12,20).

The most common COVID-19 symptoms were anosmia, ageusia, and myalgia, agreeing with other studies^(12,21). The research observed that the infection is more frequent in those who work in cities with a high incidence of COVID-19 in the general population⁽²¹⁾. It emphasizes the importance of expanding testing for health professionals to maintain adequate human resources and reduce the risk of transmission to vulnerable patients⁽²²⁾. In the univariate logistic regression, nurses with children, people with diabetes, workers in the capital, with two or more jobs, in a hospital or emergency room, in an infirmary, intensive care or emergency, and who treated patients with COVID-19 had more chances of infection. In the multivariate analysis, only having children, being diabetic, and providing direct care to patients with COVID-19 were factors associated with infection.

The research did not identify other studies on whether having children is a risk factor for COVID-19. However, it is assumed that these nurses, in addition to viral contact at work, have a more expanded community contact network or more jobs and, therefore, more exposure to the virus. For other diseases, such as human immunodeficiency virus infection, studies show that married people can have better health care due to the support of their partner and children when they assist in therapeutic treatment; but if there are children or dependent family members, there will be a division of the time available to take care of themselves and others⁽²³⁻²⁴⁾.

All the nurses lived with other people, and most had children. These professionals are afraid to transmit the infection to family members⁽⁷⁾. A systematic review with meta-analysis suggested the possibility of transmission of the new coronavirus even by asymptomatic individuals^(12,25), and health professionals have a high risk of infection for extensive contact with patients. Research pointed out that the principal way of transmission perceived by health professionals was not to use PPE consistently in the care of patients with COVID-19, in addition to contact with infected at home and community⁽²⁶⁾.

A systematic review showed that among health professionals facing pandemics, the fear of becoming infected or infecting family members was at the forefront of the mental challenges they face, and female nurses conferred greater risk. Stigmatization by family members/society may have negative implications, generate stress and isolation. For all this, coping strategies and

psychosocial support are necessary according to sociocultural environments, which, depending on the geographical location and incidence of COVID-19, can be contrasting⁽²⁷⁾.

Research shows that the most prevalent comorbidities in patients with COVID-19 are hypertension, diabetes *mellitus*, cardiovascular diseases, and chronic obstructive pulmonary disease, and are the risk factors for disease progression and unfavorable outcomes⁽²⁸⁻²⁹⁾. To date, there are no studies that demonstrate the independent predictive value of diabetes in COVID-19 mortality. However, there is speculation of an association between increased susceptibility to the virus and disease progression⁽²⁹⁾. There seems to be a tropism of the virus by beta pancreatic cells, which can contribute to a worse glycemic control, with a negative impact for people with diabetes and for those who do not present this comorbidity before the diagnosis of COVID-19⁽³⁰⁾.

Given the above, considering that vaccination and new circulating strains are still incipient in Brazil, the need to follow biosecurity measures by nurses and other health professionals, as well as the use of masks, hand washing, gel alcohol, and social distancing for the general population and health professionals when they are not in service is emphasized^(21,26).

Study limitations

A limitation of the study was that the nurses were not personally accessible due to the control measures of COVID-19 transmission in health institutions. Furthermore, due to the nature of the data collection technique, we do not know the circumstances under which nurses answered the questionnaire amidst their intense routine during the pandemic.

Contributions to the fields of Nursing, Health and Public Policy

The findings of the study point to the need for measures to support nurses during the pandemic, both within the institutions and public and labor policies. Aspects that can be considered are expanded testing for SARS-CoV-2, provision of PPE in adequate quantity and quality, ongoing in-service education, and better working conditions. Therefore, this study will be disseminated in academia and other competent bodies. We emphasize the importance of future research to evaluate measures that can improve and facilitate the work of nurses in the context of pandemics.

CONCLUSION

The prevalence of testing for SARS-CoV-2 was 63.3%, and COVID-19 was 25.0%, highlighting the symptoms of anosmia, ageusia, and myalgia. In the univariate logistic regression, nurses with children, people with diabetes, workers in the capital, with two or more jobs, in a hospital or emergency room, infirmary, ICU, or emergency room, and working on the frontline of the fight against the pandemic had more chances for COVID-19. Multivariate logistic regression analysis confirmed that only nurses with children, people with diabetes, and working in the frontline had more possibilities for COVID-19.

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