TEXTO & CONTEXTO ENFERMAGEM
TEXT & CONTEXT NURSING TEXTO & CONTEXTO ENFERMERÍA

SUSPECTED INFECTION, ABSENTEEISM AT WORK AND TESTING FOR COVID-19 AMONG NURSING PROFESSIONALS

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ABSTRACT

Objective: to identify the occurrence of the factors associated with: (1) suspected infection by the virus that causes COVID-19; (2) absenteeism at work due to suspected infection or diagnosis of infection by the virus that causes COVID-19; and (3) performance of tests for the screening of infection by the virus that causes COVID-19 among Nursing professionals.
Method: a cross-sectional study conducted with 890 nurses in June and July 2020. The associations between the outcomes and the other variables were explored using Poisson regression models with robust variance estimators.
Results: occurrence of the outcomes was (1) 35.5%, (2) 16.2% and (3) 38.2%, respectively. For suspected infection, associations were observed with assessment of the working conditions as deficient (RR: 1.55; 95% CI: 1.21-1.99) and with lack of Personal Protective Equipment (RR: 1.27; 95% CI: 1.06-1.51). Absenteeism at work was associated with the adoption of moderate social distancing (RR: 1.49; 95% CI: 1.00-2.21). To perform the screening tests, the associations with links to outpatient (RR: 2.47; 95% CI: 1.52-4.01) and hospital (RR: 2.49; 95% CI: 1.60-3.89) services stood out, in addition to direct contact with patients with confirmed COVID-19 diagnoses (RR: 1.65; 95% CI: 1.33-2.05).
Conclusion: despite the high occurrence of suspected infection and a considerable incidence of absenteeism at work among professionals from the various services under study, disparity in access to the screening tests was evidenced, especially with regard to the professionals who work in Primary Care.

DESCRIPTORS: Coronavirus. Coronavirus infections. Nursing. Laboratory tests. Health services.

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SUSPEITA DE INFECÇÃO, ABSTENÇÃO NO TRABALHO E TESTAGEM PARA COVID-19 ENTRE PROFISSIONAIS DE ENFERMAGEM

RESUMO

Objetivo: identificar a ocorrência e os fatores associados a: (1) suspeita de infecção pelo vírus causador da COVID-19; (2) abstenção no trabalho devido à suspeita ou ao diagnóstico de infecção pelo vírus causador da COVID-19 e (3) realização de testes para o rastreio de infecção pelo vírus causador da COVID-19 entre profissionais de Enfermagem.
Método: estudo transversal realizado com 890 enfermeiros entre os meses de junho e julho de 2020. As associações entre os desfechos e as demais variáveis foram exploradas com a utilização de modelos de regressão de Poisson com estimadores robustos de variância.
Resultados: a ocorrência dos desfechos foi de (1)35,5%, (2)16,2% e (3)38,2%. Para a suspeita de infecção, foram observadas associações com a avaliação das condições de trabalho como ruins (RR:1,55; IC 95%: 1,21-1,99) e a falta de Equipamentos de Proteção Individual (RR:1,27; IC 95%: 1,06-1,51). A abstenção do trabalho esteve associada com a adoção de distanciamento social moderado (RR:1,49; IC 95%: 1,00-2,21). Para a realização de testes de rastreio, destacam-se as associações com a vinculação a serviços ambulatoriais (RR:2,47; IC 95%: 1,52-4,01) e hospitalares (RR:2,49; IC 95%: 1,60-3,89), além do contato direto com pacientes confirmadamente acometidos pela COVID-19 (RR:1,65; IC 95%: 1,33-2,05).
Conclusão: apesar da elevada ocorrência de suspeitas de infecção e um número considerável de abstenção do trabalho entre profissionais dos diversos serviços estudados, foi evidenciada uma disparidade no acesso aos testes de rastreio, especialmente no que se refere aos profissionais da Atenção Primária.

DESCRITORES: Coronavírus. Infecções por coronavírus. Enfermagem. Testes laboratoriais. Serviços de Saúde.

SOSPECHA DE INFECCIÓN, AUSENTISMO LABORAL Y PRUEBAS DE DETECCIÓN DE COVID-19 ENTRE PROFESIONAIS DE ENFERMERÍA

RESUMEN

Objetivo: identificar la incidencia y los factores asociados con: (1) sospecha de infección por el virus que causa COVID-19; (2) ausencia laboral debido a sospecha o diagnóstico de infección por el virus que causa COVID-19; y (3) pruebas para detectar la infección por el virus que causa COVID-19 entre profesionales de Enfermería.
Método: estudio transversal realizado con 890 profesionales de Enfermería durante los meses de junio y julio de 2020. Las asociaciones entre los resultados y las demás variables se estudiaron por medio de modelos de regresión de Poisson con estimadores robustos de varianza.
Resultados: la incidencia de los resultados fue: (1)35,5%, (2)16,2% y (3)38,2%. Para la sospecha de infección, se observaron asociaciones con condiciones de trabajo evaluadas como deficientes (RR:1,55; IC 95%: 1,21-1,99) y con la falta de Equipos de Protección Personal (RR:1,27; IC 95%: 1,06-1,51). La ausencia laboral se asoció con la adopción de distanciamiento social moderado (RR:1,49; IC 95%: 1,00-2,21). Para llevar adelante las pruebas de detección, se destacaron las asociaciones con la vinculación a servicios ambulatorios (RR:2,47; IC 95%: 1,52-4,01) y hospitalarios (RR:2,49; IC 95%: 1,60-3,89), además del contacto directo con pacientes con diagnósticos confirmados da COVID-19 (RR:1,65; IC 95%: 1,33-2,05).
Conclusión: pese a la elevada incidencia de sospechas de infección y una considerable cantidad de ausencias laborales entre profesionales de los diversos servicios estudiados, se evidenció cierta disparidad en el acceso a las pruebas de detección, especialmente en lo que se refiere a los profesionales de Atención Primaria.

DESCRIPTORES: Coronavirus. Infecciones por coronavirus. Enfermería. Pruebas de laboratorio. Servicios de salud.

INTRODUCTION

Covid -19, a disease caused by the SARS-CoV-2 Coronavirus, was recorded for the first time in December 2019 in Wuhan, China, and later spread throughout the world, affecting millions of people, especially in the American and European continents. Until July 2021, the World Health Organization (WHO) pointed to the occurrence of more than 193 million cases, in addition to 4.14 million deaths, with 19.5 million cases and 547,000 deaths in Brazil alone[1].

In the absence of a treatment with proven efficacy for the disease, one of the most important problems in fighting the pandemic turns vaccination and the social distancing strategy into the main intervention and control actions against COVID-19, together with the hand hygiene measures. However, for the professionals working in the health area, especially those in the front line of the Primary Care services, in the emergency care units and in the hospital services, social distancing is not possible[2].

As a result of this scenario, a number of studies have evidenced high COVID-19 infection rates among health professionals, with this segment of workers accounting for 14% of the infections recorded worldwide[1]. In Italy, until March 2020, approximately 20% of the health professionals had been infected[3]. In the Americas, according to the Pan American Health Organization (PAHO), more than 570,000 professionals were contaminated by September 2020, accounting for 2,500 deaths[4].

In this context, it is worth highlighting Nursing professionals, who globally correspond to approximately half of the health workforce, being those who, in the pandemic scenario, perform most of the tasks related to infection prevention and containment. In addition to that, it is to be considered that the Nursing team corresponds to the professionals who are more active in the direct care provided to patients infected or suspected of being infected by the virus that causes covid D-19[5].

Based on this reality, there is a need for the health systems to safeguard these professionals through prompt training, reduction of unnecessary contacts and provision of Personal Protective Equipment (PPE), in addition to testing and to monitoring the symptoms associated with COVID-19[2,6].

However, although mass testing strategies have been adopted by several countries as a means for the early identification of cases and consequent reduction in the incidence of cross-contamination, in Brazil, access to tests in a timely manner has been an important challenge, even for health professionals[7].

A number of studies carried out in countries such as China, Mexico and the United States indicated the risk factors for contamination by the virus that causes COVID-19 among health professionals. Spread of the virus in the hospital environment was one of the causes of infection for health professionals, especially due to close contact with infected individuals (patients and/or co-workers)[8–9]. In addition to these factors, the working conditions, the lack of PPE and the high stress level among health professionals, especially among those in the Nursing area, were also verified as potential factors that increased the health professionals' risk of contamination by the virus that causes COVID-19[10–11].

However, no studies were found that investigated the proportion of tests performed to screen infection by the virus that causes COVID-19 among health professionals in Brazil. Therefore, this research contributes to the identification of the aspects that have influenced the occurrence of infection by the virus that causes COVID-19 and absenteeism at work by Nursing professionals at the different care levels.

In this sense, the objective of this study was to identify the occurrence of the factors associated with: (1) suspected infection by the virus that causes COVID-19; (2) absenteeism at work due to suspected infection or diagnosis of infection by the virus that causes COVID-19; and (3) performance of tests for the screening of infection by the virus that causes COVID-19 among Nursing professionals.

METHOD

A cross-sectional study was conducted in June and July 2020 with Nursing professionals from Pelotas, a municipality located in southern Brazil. The services aimed at coping with the pandemic included in this study were the following: 50 basic health units; two ambulances; two hospital services; an emergency service; a mobile emergency response service; and a teleconsultation service, in addition to the municipal epidemiological surveillance service and the hospital bed regulation center. According to a prior survey, the total of Nursing professionals linked to these services was 1,297. To access these professionals, the aforementioned institutions were contacted and clarified as to the study objectives and their ethical commitment to use the data only for research purposes, with requests for consent to carry out the study and obtain the contact information of the professionals linked to them.

The inclusion criteria for this study were as follows: Nursing professionals over 18 years old duly registered with the Regional Nursing Council (*Conselho Regional de Enfermagem*, COREN), who worked in the services to fight the pandemic. The exclusion criteria were being on vacation or distanced from the work activities during the data collection period (90 professionals). 21 professionals were also excluded because the institutions were not able to provide any valid contact means, such as: e-mail address, WhatsApp®, cell phone number or land phone line.

At the end of data collection, among the eligible professionals (n=1,186), 944 successful contacts were made, with 242 cases in which the contact attempts were unsuccessful. The study protocol provided for a first phase comprised of five contact attempts via e-mail or WhatsApp, followed by a second phase in which up to ten phone contact attempts were made. Of the successful contacts, 54 refused to participate in the research, resulting in a response rate of 75% (n=890).

Data collection took place through a self-administered online questionnaire, developed based on a literature review and validated through a pilot stage with the participation of ten professionals. After being contacted and accepting to participate in the study, the professionals received the link to access the questionnaire, which could only be answered after reading and agreeing to the Free and Informed Consent Form.

The following question was asked to study the occurrence of suspected infection by the virus that causes COVID-19 among the professionals under study: “Did you at any moment suspect about being contaminated by COVID-19?” For the study of absenteeism at work due to suspected or confirmed infection by the virus that causes COVID-19, the following question was asked: “Did you ever take time away from your work activities due to suspected or confirmed infection by COVID-19?” And the following question was asked to conduct tests for screening infection by the virus that causes COVID-19: “Did you ever undergo any screening test for COVID-19 such as a rapid test or laboratory test?” All the questions were treated in a dichotomous manner, offering “yes” and “no” as answer options.

The other covariates included in the study were gender, skin color, age, schooling, *per capita* income, risk group (hypertensive individuals, diabetics, heart disease patients, patients with respiratory diseases or those using immunosuppressants were characterized as belonging to the risk group), type of service, Nursing category, training to fight against COVID-19, assessment of the working conditions, level of involvement with COVID-19 cases, lack of PPE (report of lack of at least one PPE piece considered necessary for the care provided by the professional), level of restriction of social contact (Mild: adopted some safety measure, such as reducing social contacts or visits to older adults, but continued going out of the house for non-essential demands; Moderate: in addition to work, went out of the house only for essential activities, such as shopping at the supermarket or pharmacy; Intense: not going out of the house for any type of activity other than work).

The statistical analyses were performed in Stata 16 (Stata Corporation, College Station, Texas, USA). In addition to its occurrence in the general study population, the prevalence of the outcomes

under study was calculated for the strata of each of the covariates. The calculations were performed based on the valid data. The missing information was excluded from the analysis.

The associations between the study outcomes and the covariates were tested using unadjusted and adjusted Poisson regression models with robust variance estimators. Each of the adjusted analyses was preceded by the selection of the confounding factors by the *stepwise forward* method among the study covariates. The selection criterion for inclusion was p-value≤0.20[12].

With regard to the occurrence of suspected infection, the covariates selected as potential confounders were the following: age; training to fight against COVID-19; assessment of the working conditions; lack of PPE; and level of involvement with COVID-19 cases. As for absenteeism due to suspected or confirmed infection, the covariates selected as potential confounders were as follows: assessment of the working conditions, lack of PPE and level of restriction of social contact. Regarding the screening tests, the covariates selected as potential confounders were skin color, age, schooling, *per capita* income, risk group, type of service and level of involvement with COVID-19 cases.

The study was submitted for consideration and approved by an accredited Ethics Committee, following the Brazilian regulatory standards and guidelines for research involving human beings (CNS Resolution No. 466/2012), in addition to the Declaration of Helsinki. The ethical principles of this study were observed by guaranteeing the right not to participate in the research from the first contact and by adopting the informed consent in which, by accepting, the participant agreed with data disclosure for scientific purposes, preserving anonymity. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE statement) guidelines were followed in this study.

RESULTS

Characterization of the participants

A total of 890 Nursing professionals answered the online questionnaire. Of these, 319 (35.8%) were nurses, 501 (56.3%) were nursing technicians and 70 (7.86%) were nursing assistants. Most of the participants were female (84.8%; n=755) and the mean age was 40.4 years old (SD=8.58). Regarding skin color, 75% (n=665) of the participants self-declared as white-skinned, 14% (n=122) as brown-skinned and 12% (n=103) as black-skinned. Most of the participants had a *per capita* income of up to two minimum wages (38%; n=305). As for the workplace, 65% (n=577) of the professionals worked in hospital services, 13% (n=118) in Primary Care, 10% (n=92) in outpatient services, 9% (n=84) in urgency and emergency services and 2% (n=19) in administrative services. Among the variables studied, the only one with missing data was *per capita* income, in which valid information was not obtained for eight professionals.

Suspected infection

Occurrence of suspected infection by the virus that causes COVID-19 was reported by 35.5% of the professionals included in the study. Occurrence of this outcome in relation to each of the covariates included in the study and the unadjusted relative risk values are presented in Table 1. The adjusted relative risk values for this outcome are shown in Table 2, where it is possible to observe evidence of an association between suspected infection and assessment of the working conditions as deficient (RR: 1.55; 95% CI: 1.21-1.99) and with lack of PPE (RR: 1.27; 95% CI: 1.06-1.51).

Absenteeism at work

Occurrence of absenteeism at work due to suspected or confirmed infection with the virus that causes COVID-19 was reported by 16.2% of the professionals under study. Occurrence of this

outcome in relation to each of the covariates included in the study and the unadjusted relative risk values are presented in Table 1. The adjusted relative risk values for this outcome are shown in Table 2, where it is possible to observe its association with the adoption of moderate social distancing (RR: 1.49; 95% CI: 1.00-2.21).

Tests for screening

Performance of tests for the screening of infection by the virus that causes COVID-19 was reported by 38.2% of the professionals. Occurrence of this outcome in relation to each of the covariates included in the study and the unadjusted relative risk values are presented in Table 1. The adjusted relative risk values for this outcome are shown in Table 2, where it is possible to observe evidence of an association between testing and *per capita* income of more than three minimum wages and with links to outpatient (RR: 2.47; 95% CI: 1.52-4.01) and hospital (RR: 2.49; 95% CI: 1.60-3.89) services, in addition to direct contact with patients with confirmed COVID-19 diagnoses (RR: 1.65; 95% CI: 1.33-2.05). A negative association was also observed between performance of tests and graduate schooling level (RR: 0.73; 95% CI: 0.57-0.92).

Testing *versus* suspected infection and absenteeism

Among the professionals who presented suspected infection by the virus that causes COVID-19 (n=316), 63.0% (n=199) underwent some infection screening test. Among those who were in fact absent from work due to suspected or confirmed infection with the virus that causes COVID-19 (n=144), 74.3% (n=107) underwent some infection screening test.

Table 1 – Unadjusted proportions and associations between suspected infection, work leave and testing, and study of the estimated covariates using Poisson regression models. Pelotas, RS, Brasil, 2020. The data are Relative Risks (RR) with their corresponding 95% Confidence Intervals (CIs) (n=890).

	n	Suspected infection		Work leave		Testing	
		%	Unadjusted RR (95% CI)	%	Unadjusted RR (95% CI)	%	Unadjusted RR (95% CI)
Gender							
Female	755	35.2	1	16.1	1	37.3	1
Male	135	37.0	1.05 (0.92-1.33)	16.3	1.00 (0.66-1.52)	42.9	1.15 (0.92-1.42)
Skin color							
White	665	34.4	1	15.4	1	15.4	1
Brown	122	40.1	1.16 (0.91-1.48)	19.6	1.27 (0.85-1.89)	19.6	1.27 (1.02-1.59)
Black	103	36.8	1.07 (0.81-1.40)	16.5	1.06 (0.66-1.70)	16.5	1.37 (1.09-1.71)*
Age							
More than 30	117	32.4	1	17.0	1	17.0	1
31-40	365	40.0	1.23 (0.92-1.64)	17.8	1.04 (0.66-1.64)	17.8	1.24 (0.95-1.61)
41-50	292	36.6	1.12 (0.83-1.52)	14.7	0.86 (0.53-1.39)	14.7	0.96 (0.72-1.28)
51+	116	21.5	0.66 (0.42-1.02)	13.7	0.80 (0.44-1.47)	13.7	0.60 (0.40-0.92)

Table 1 – Cont.

	n	Suspected infection		Work leave		Testing	
		%	Unadjusted RR (95% CI)	%	Unadjusted RR (95% CI)	%	Unadjusted RR (95% CI)
Schooling							
High School	330	24.8	1	16.6	1	16.6	1
Graduate	212	37.2	1.06 (0.85-1.34)	18.4	1.10 (0.76-1.60)	18.4	1.01 (0.82-1.25)
Postgraduate	348	35.0	1.00 (0.81-1.23)	14.3	0.86 (0.60-1.22)	14.3	0.87 (0.72-1.06)
Per capita income							
Up to 1 minimum wage	205	32.2	1	14.1	1	14.1	1
Up to 2 minimum wages	305	37.3	1.16 (0.90-1.48)	18.0	1.27 (0.84-1.92)	18.0	1.03 (0.80-1.32)
Up to 3 minimum wages	132	31.0	0.96 (0.69-1.33)	11.3	0.80 (0.44-1.44)	11.3	1.14 (0.86-1.53)
> 3 minimum wages	168	38.6	1.20 (0.91-1.58)	17.8	1.26 (0.79-2.01)	17.8	1.34 (1.04-1.73)
Risk group							
No	606	35.3	1	15.5	1	15.5	1
Yes	284	35.9	1.01 (0.84-1.22)	17.6	1.13 (0.83-1.55)	17.6	0.73 (0.60-0.89)*
Type of service							
Primary Care	118	29.6	1	11.8	1	11.8	1
Outpatient	92	41.3	1.39 (0.96-2.01)	15.2	1.28 (0.64-2.55)	15.2	3.49 (2.18-5.56)†
Emergency	84	32.1	1.08 (0.71-1.64)	16.6	1.40 (0.70-2.78)	16.6	1.56 (0.88-2.76)
Hospital	577	37.0	1.25 (0.92-1.68)	17.6	1.48 (0.88-2.51)	17.6	2.86 (1.85-4.42)†
Administrative	19	10.5	0.35 (0.92-1.35)	0.00	5.67 (2.91-1.10)†	0.00	0.34 (0.49-2.43)
Nursing category							
Nurse	319	35.4	1	15.3	1	15.3	1
Technician	501	36.3	1.02 (0.84-1.23)	17.7	1.15 (0.84-1.59)	17.7	1.07 (0.89-1.27)
Assistant	70	35.4	0.84 (0.57-1.24)	8.5	0.55 (0.24-1.25)	8.5	0.68 (0.44-1.04)
Specific training on COVID-19							
No	319	39.5	1	18.5	1	18.5	1
Yes	571	33.2	0.84 (0.70-1.00)	14.8	0.80 (0.59-1.08)	14.8	1.05 (0.88-1.25)
Assessment of the working conditions							
Good	325	27.3	1	12.6	1	12.6	1
Fair	409	37.1	1.35 (1.09-1.68)†	17.8	1.41 (0.99-2.01)	17.8	1.14 (0.94-1.38)
Deficient	156	48.0	1.75 (1.37-2.23)†	19.2	1.52 (0.99-2.34)	19.2	1.13 (0.88-1.44)

Table 1 – Cont.

	n	Suspected infection		Work leave		Testing	
		%	Unadjusted RR (95% CI)	%	Unadjusted RR (95% CI)	%	Unadjusted RR (95% CI)
Involvement with COVID-19 cases							
None	288	32.6	1	17.3	1	17.3	1
Indirect work	65	24.6	0.75 (0.47-1.19)	12.3	0.70 (0.35-1.42)	12.3	0.89 (0.60-1.33)
Contact with suspected cases	310	38.0	1.16 (0.93-1.45)	14.1	0.81 (0.56-1.18)	14.1	0.84 (0.66-1.06)
Contact with confirmed cases	277	38.7	1.18 (0.94-1.49)	18.5	1.06 (0.73-1.54)	18.5	1.67 (1.38-2.03)†
Lack of Personal Protective Equipment							
No	508	227	1	14.1	1	14.1	1
Yes	382	568	1.36 (1.14-1.62)	18.8	1.32 (0.98-1.79)	18.8	0.96 (0.81-1.14)
Degree of social distancing							
Slight	227	227	1	11.8	1	11.8	1
Moderate	568	568	1.21 (0.96-1.51)	17.9	1.51 (1.01-2.25)	17.9	1.04 (0.85-1.28)
Intense	95	95	1.16 (0.83-1.61)	15.7	1.36 (0.75-2.45)	15.7	1.12 (0.83-1.50)
Total	**890**						

*p-value<0.05; †p-value<0.001

Table 2 – Adjusted proportions and associations between suspected infection, work leave and testing, and study of the estimated covariates using Poisson regression models. Pelotas, RS, Brasil, 2020. The data are Relative Risks (RR) with their corresponding 95% Confidence Intervals (CIs) (n=890).

	n	Suspected infection	Work leave	Testing
		Adjusted† RR (95% CI)	Adjusted‡ RR (95% CI)	Adjusted‡‡ RR (95% CI)
Gender				
Female	755	1	1	1
Male	135	1.03 (0.81-1.30)	0.99 (0.66-1.40)	1.07 (0.85-1.34)
Skin color				
White	665	1	1	1
Brown	122	1.11 (0.87-1.41)	1.22 (0.82-1.81)	1.23 (0.99-1.54)
Black	103	1.03 (0.78-1.35)	1.04 (0.65-1.66)	1.28 (1.02-1.61)
Age				
More than 30	117	1	1	1
31-40	365	1.19 (0.87-1.62)	0.98 (0.62-1.55)	1.22 (0.93-1.60)
41-50	292	1.09 (0.78-1.50)	0.84 (0.52-1.38)	0.95 (0.70-1.28)
51+	116	0.68 (0.43-1.05)	0.77 (0.42-1.41)	0.73 (0.48-1.12)
Schooling				
High School	330	1	1	1
Undergraduate student	212	1.07 (0.86-1.35)	1.11 (0.77-1.61)	0.87 (0.70-1.09)
Graduate	348	1.06 (0.87-1.30)	0.85 (0.60-1.21)	0.73 (0.57-0.92)*

Table 2 – Cont.

	n	Suspected infection	Work leave	Testing
		Adjusted† RR (95% CI)	Adjusted‡ RR (95% CI)	Adjusted‡‡ RR (95% CI)
Per capita income				
Up to 1 minimum wage	205	1	1	1
Up to 2 minimum wages	305	121 (0.95-1.54)	1.27 (0.84-1.92)	1.24 (0.97-1.60)
Up to 3 minimum wages	132	1.04 (0.75-1.43)	0.83 (0.46-1.49)	1.36 (1.02-1.82)
> 3 minimum wages	168	1.32 (1.00-1.75)	1.27 (0.80-2.03)	1.65 (1.23-2.22)**
Risk group				
No	606	1	1	1
Yes	284	0.97 (0.80-1.18)	1.05 (0.76-1.44)	0.86 (0.70-1.05)
Type of service				
Primary Care	118	1	1	1
Outpatient	92	1.32	1.35 (0.68-2.68)	2.47 (1.52-4.01)**
Emergency	84	0.95	1.28 (0.70-2.73)	1.30 (0.73-2.33)
Hospital	577	1.23	1.42 (0.84-2.40)	2.49 (1.60-3.89)**
Administrative	19	0.47	-	0.45 (0.06-3.34)
Nursing category				
Nurse	319	1	1	1
Technician	501	0.93 (0.76-1.13)	1.10 (0.80-1.53)	1.00 (0.75-1.35)
Assistant	70	0.93 (0.61-1.42)	0.51 (0.22-1.15)	0.76 (0.44-1.31)
Specific training on COVID-19				
No	319	1	1	1
Yes	571	0.85 (0.72-1.02)	0.82 (0.61-1.11)	1.01 (0.82-1.24)
Assessment of the working conditions				
Good	325	1	1	1
Fair	409	1.25 (1.00-1.56)	1.33 (0.93-1.89)	1.19 (0.98-1.43)
Deficient	156	1.55 (1.21-1.99)**	1.41 (0.91-2.17)	1.24 (0.96-1.59)
Involvement with COVID-19 cases				
None	288	1	1	1
Indirect work	65	0.77 (0.49-1.21)	0.76 (0.37-1.54)	0.85 (0.55-1.31)
Contact with suspected cases	310	1.18 (0.95-1.46)	0.84 (0.58-1.22)	1.01 (0.79-1.30)
Contact with confirmed cases	277	1.20 (0.95-1.51)	1.14 (0.78-1.65)	1.65 (1.33-2.05)**
Lack of Personal Protective Equipment				
No	508	1	1	1
Yes	382	1.27 (1.06-1.51)*	1.22 (0.90-1.65)	0.98 (0.82-1.16)
Degree of social distancing				
Slight	227	1	1	1
Moderate	568	1.18 (0.94-1.47)	1.49 (1.00-2.21)*	1.02 (0.83-1.26)
Intense	95	1.18 (0.85-1.64)	1.38 (0.77-2.50)	1.19 (0.89-1.60)
TOTAL	**890**			

*p-value<0.05; †Adjusted for: age; training to fight against COVID-19; assessment of the working conditions; lack of PPE; and level of involvement with COVID-19 cases; ‡Adjusted for: assessment of the working conditions; lack of PPE; and degree of social contact restriction; **p-value<0.001; ‡‡Adjusted for: skin color; age; schooling; *per capita* income; risk group; type of services; and level of involvement with COVID-19 cases.

DISCUSSION

The results of this study point to an alarming reality in how the fight against the pandemic took place during the period researched with regard to the care offered to the Nursing professionals included in the study. It was possible to observe that, despite a high prevalence of Nursing workers with COVID-19 symptoms, performance of tests (rapid test or laboratory exam) for the screening of COVID-19 cases among professionals was far insufficient. It is noteworthy that, even in some of the cases in which the professionals were distanced from their work activities due to the COVID-19 symptoms, testing was not performed, suggesting weaknesses in the system.

On the other hand, the conduction of local efforts to minimize the risks is pointed out. Among the results that support this perspective, there was the difference in the prevalence of testing across the services, the prioritization of the services especially involved in the care of people with COVID-19 (outpatient clinics and hospitals), in addition to the lower prevalence of testing among older professionals and those belonging to the risk groups. Although it sounds contradictory, this aspect can be related to the reorganization implemented by the services in their staff in order to relocate these professionals to wards with less exposure to the virus, which may have led to a lower proportion of symptomatic workers and, therefore, to a smaller proportion of tests performed.

It is noted that the low proportion of testing observed in this study contrasts with the recommendations of the Brazilian National Health Council (*Conselho Nacional de Saúde*, CNS) since, in May 2020, the CNS advised that the professionals who work in direct contact with COVID-19 cases were a priority in testing for case screening[13]. This is an extremely important measure that has been recommended even in the absence of symptoms[14], as infection can be asymptomatic, being thus ignored by the professional, favoring transmission to other coworkers, patients and family members[15–16].

The results of this research regarding workers with COVID-19 symptoms are consistent with previous studies that found a higher occurrence of COVID-19 among professionals aged between 30 and 50 years old[14,16–18]. They also corroborate the perspective that occurrence of the disease is related to the workplace, being more prevalent in hospital and emergency services. Among the professionals infected by the virus that causes COVID-19, 77.5% worked in hospital services and 17.5% did so in emergency services[8].

Also regarding the type of services to which the professionals are linked, a literature review[19] pointed to a higher concentration of symptomatic and confirmed cases among professionals in hospital and emergency services, with lower proportions among the professionals working in the Primary Care. However, it is worth mentioning that the proportion of tests is expected to follow that of symptomatic individuals. Although this aspect has been confirmed for the hospital and emergency services, where the proportion of testing was slightly higher than that of symptomatic patients (43.6% *versus* 37.0% in the hospital; 32.1% *versus* 23.8% in the emergency service), in Primary Care the proportion of testing was approximately half the proportion of symptomatic patients (15.1% *versus* 29.6%).

Although Primary Care is mistakenly not being prioritized in the formulation of the policies to fight against the pandemic in the country, the professionals cannot be abandoned. Likewise, it is noteworthy that these services, due to their attributes of territorial responsibility and community guidance, are the ones that demonstrate the greatest potential for health surveillance in the territories, care for patients with mild home-managed COVID-19 cases and support to vulnerable groups, such as older adults and people with chronic conditions[20–21]. In addition to that, these are the services that will have to address the problems arising from prolonged social isolation and precariousness of the population's social and economic life[21].

From the point of view of the organization of the services, it is noteworthy that the results of this study point to significant differences in the proportion of testing in relation to the type of involvement with

COVID-19 cases and the proportion of the workload devoted to actions to fight against the pandemic. The professionals who worked with confirmed COVID-19 cases presented the highest proportion of tests; however, those who worked with symptomatic cases were tested in a smaller proportion, even when compared to the professionals who stated that they had no involvement with COVID-19 cases.

This finding seems to reflect certain concentration of availability of tests in specific sectors for the care of COVID-19 cases, which is understandable given the need for prioritization imposed by the scarcity of resources, especially at the beginning of the pandemic. However, it is necessary to consider that lack of assistance to less specialized sectors, but which are also receiving symptomatic cases, entails critical consequences for the system. A systematic review[9] showed that the number of infected professionals has shown to be higher in non-specialized wards when compared to high-complexity sectors focused on treating COVID-19 cases.

Among the aspects that have been evidenced as important contributors to this scenario is the lower availability of PPE in non-specialized areas[22–25]; whereas the sectors exclusively devoted to the care of COVID-19 cases have been prioritized with the regular supply of PPE, others have very frequently faced lack of this type of equipment, which is one of the major concerns reported by professionals from various countries[10–11]. It is noteworthy that, corroborating this perspective, the results of this study point to the association between the reporting of symptoms and the lack of PPE during the study period.

As this is a cross-sectional study, it is necessary to consider aspects such as inverse causality, which precluded delimitation of causal relationships. This perspective is well represented by the association found between worse working conditions and the prevalence of symptomatic cases. At the same time that precarious working conditions can lead to a greater chance of spreading the disease, exposure in the workplace and the possibility of getting infected can affect the professional's judgment regarding these conditions.

It is known that, in general, the worse assessment of the working conditions among the Nursing professionals is related to several objective and subjective factors, such as long working hours, low wages, multiple jobs, reduced staff, feeling overload and conflicting relationships with coworkers and management[26]. In addition to that, as shown by a study conducted in India[27], the pandemic has added to this scenario a high level of dissatisfaction with the administrative support offered by the services, in addition to the insecurity caused by the lack of PPE in adequate numbers and quality.

In this study, the professionals who self-declared as black-skinned were more prone to have undergone some test for the screening of infection by the virus that causes COVID-19. However, a hypothesis that deserves to be explored in subsequent studies is the relationship of this finding with the structural racism that marks society and, consequently, the health system. A study[28] carried out in the United States and in the United Kingdom showed that black-skinned health professionals were more likely to work in higher-risk places and with patients diagnosed with COVID-19, therefore being more exposed.

Finally, although no associations were found between work leave due to suspected or confirmed COVID-19 diagnoses and other variables besides the adoption of a moderate degree of social distancing, it is necessary to consider that a significant portion of the professionals had already needed to be absent from work. It is also noteworthy that this data can be biased by the methodological option of the study to exclude from the sample professionals who were on a work leave during the entire data collection period (90 professionals). For ethical reasons, the justification for the work leave cannot be revealed by the institutions, so it is not known how many of these professionals may have been distanced due to suspected or confirmed infection by the virus that causes COVID-19.

Either way, this is a point that evidences the need for the services to invest in better working conditions, aiming to ensure the professionals' biosafety in order to avoid further absenteeism. It is

noteworthy that this outcome aggravates the work situation of the remaining professionals since, with the reduction in the number of workers available in the institutions, there is exacerbation in the physical and psychological burden of the professionals who remain on the front line[29].

CONCLUSION

The study achieved the initially-proposed objective by identifying the factors associated with suspected infection by the virus that causes COVID-19, with absenteeism at work due to suspected or confirmed infection by the virus that causes COVID-19 and with performance of COVID-19 screening tests among Nursing professionals.

Although high occurrence of symptoms of infection by the virus that causes COVID-19 was observed among the professionals under study, there was a low proportion of COVID-19 screening tests, either in general situations or even in those where the professionals reported symptoms or were distanced from work due to them.

The type of service and the professionals' working conditions were important markers for the cases of workers with symptoms and testing, and it is important to emphasize the association between suspected infection and worse working conditions, as well as with lack of PPE. Testing was better among the professionals from the outpatient and hospital services and among those with direct contact with potentially infected people. These findings point to an important path towards a better understanding of the spread of the virus that causes COVID-19, as well as its screening and consequences in the work process of Nursing workers.

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NOTES

ORIGIN OF THE ARTICLE

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CONFLICT OF INTEREST

There is no conflict of interest.

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