

Factors related to coronavirus infection in workers at fast-track basic health units

Fatores relacionados à infecção por coronavírus em trabalhadores de unidades básicas de saúde fast-track

Factores relacionados con la infección por coronavirus en trabajadores de unidades básicas de salud de atendimento rápido

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Abstract

Objective: To identify the factors related to infection by the new coronavirus in workers of fast-track basic health units. **Methods:** Cross-sectional study carried out in the capital of Piauí with 114 health workers in four fast-track basic units between August and November 2021. Questionnaires were applied with sociodemographic, occupational and performance-related variables during the COVID-19 pandemic. Data were analyzed using descriptive and inferential statistics. A significance level of 0.05 was adopted. **Results:** Among the sample, 93.9% tested for COVID-19, and 48.2% of them had a positive result. The most used protective equipments were: surgical mask (92.1%), caps (87.7%) and procedure/sterile gloves (64.0%). Regarding access to biosafety training, the participants said they had participated in training for the placement and removal of PPE (57.9%) and hand hygiene (64%). Regarding the use of the N95 mask or similar, 28.9% said they did not use it. **Conclusion:** Ensuring access to protective equipment of sufficient quality and quantity, the rational use of these inputs, proper handling and disposal and actions aimed at avoiding physical and emotional exhaustion of workers are fundamental strategies to overcome the crisis and preserve the health of these individuals.

Descriptors: Health personnel; Primary health care; Occupational risks; Coronavirus infections.

Whats is already known on this?

The exposure of health professionals to the new coronavirus is aggravated by the scarcity and/or inappropriate use of personal protective equipment, work overload and undersizing of human resources.

What this study adds?

The study provided updates on the theme for the scientific field, pointing out a new panorama in relation to the literature and the importance of valuing workers in their work environments.



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Resumo

Objetivo: Identificar os fatores relacionados à infecção pelo novo coronavírus em trabalhadores de unidades básicas de saúde fast-track. **Métodos:** Estudo transversal, realizado na capital do Piauí, com 114 trabalhadores de saúde em 4 unidades básicas fast-track, entre agosto e novembro de 2021. Aplicaram-se questionários com variáveis sociodemográficas, ocupacionais e relativas à atuação durante a pandemia da COVID-19. Os dados foram analisados por meio de estatísticas descritivas e inferenciais. Adotou-se o nível de significância de 0,05. **Resultados:** Dentre a amostra, 93,9% realizaram teste para COVID-19; destes, 48,2% obtiveram resultado positivo. Os equipamentos de proteção mais utilizados foram máscara cirúrgica (92,1%), toucas (87,7%) e luvas de procedimento/estéril (64,0%). Quanto ao acesso a treinamento em biossegurança, afirmaram ter participado de treinamento para colocação e retirada de EPIs (57,9%) e higienização das mãos (64%). Em relação ao uso da máscara N95 ou similar, 28,9% afirmaram não utilizar. **Conclusão:** A garantia de acesso a equipamentos de proteção de qualidade e quantidade suficiente, o uso racional desses insumos, o manuseio e descarte de forma adequada e ações voltadas para evitar o desgaste físico e emocional dos trabalhadores são estratégias fundamentais para superar a crise e preservar a saúde desses indivíduos.

Descritores: Pessoal de saúde; Atenção primária à saúde; Riscos ocupacionais; Infecções por coronavírus.

Resumen

Objetivo: Identificar los factores relacionados con la infección por el nuevo coronavirus en trabajadores de unidades básicas de salud de atendimento rápido. **Métodos:** Estudio transversal, realizado en la capital de Piauí, con 114 trabajadores de la salud en cuatro unidades básicas de atendimento rápido, entre agosto y noviembre de 2021. Se aplicaron cuestionarios con variables sociodemográficas, ocupacionales y relacionadas con el desempeño durante la pandemia de COVID-19. Los datos se analizaron mediante estadística descriptiva e inferencial. Se adoptó un nivel de significación de 0,05. **Resultados:** Entre la muestra, el 93,9% se realizó la prueba de COVID-19, de los cuales el 48,2% resultó positivo. El equipo de protección más utilizado fue: mascarilla quirúrgica (92,1%), gorros (87,7%) y guantes de procedimiento/estériles (64,0%). En cuanto al acceso a la capacitación en bioseguridad, dijeron haber participado en capacitación para ponerse y quitarse los EPP (57,9%) e higiene de manos (64%). En cuanto al uso de mascarilla N95 o similar, el 28,9% dijo no usarla. **Conclusión:** Son estrategias clave para superar la crisis y preservar la salud de estos individuos asegurarles el acceso a equipos de protección en calidad y cantidad suficientes, que usen racionalmente estos insumos, que los manejen y dispongan de ellos adecuadamente, además de acciones encaminadas a prevenir el desgaste físico y emocional de estos funcionarios.

Descriptores Personal de salud; Primeros auxilios; Riesgos laborales; Infecciones por coronavirus.

INTRODUCTION

In Brazil, care in the fast track format, or fast flow, implemented in Basic Health Units (BHU), was one of the strategies used to face the COVID-19 pandemic. These units were intended to exceptionally serve flu-like syndromes, using the fast track approach to speed up care, reduce crowds and prevent patients suspected of being infected by the new coronavirus from having contact with other users of the system. Therefore, it is a place of high transmissibility of the virus.^(1,2)

As they act on the front line in the fight against Sars-Cov-2, health service workers are part of a group at high risk of contamination and the lack of these servers implies, in principle, difficulties in human resource management, and also in the quality and potential response of health services to COVID-19.⁽³⁾

According to the National Health Surveillance Agency (ANVISA), health service workers are all those who work in health care and surveillance spaces and establishments, including health professionals and support workers, who do not work directly in people's health care, but who contribute in other functions with the service. By November 2021, there were more than 640,000 reported cases of COVID-19 in Brazilian health workers, with nursing technicians/assistants being the category with the highest records.^(4,5)

Studies show that among the main risk factors associated with infection by the new coronavirus are inadequate hand hygiene, work overload and the scarcity and inappropriate use of Personal Protective Equipment (PPE). While the use of surgical masks by professionals was considered a significant factor for the risk of COVID-19 when compared to those who wear N95 or similar masks.^(6,7)

Through a conjuncture analysis carried out with health workers from the Family Health Strategy (FHS) and vaccine rooms, residing in one of the most populous municipalities in the state of Piauí, insufficient knowledge regarding the proper use of this equipment was evidenced, emerging a warning sign to know this reality in other municipalities in the state, such as its own capital.⁽⁸⁾

Thus, identifying and recognizing the factors related to this infection in health workers contributes to the work of health managers, helping to develop strategies aimed at promoting worker health.

Therefore, the study aims to identify the factors related to infection by the new coronavirus in workers of fast-track basic health units.

METHODS

This is a quantitative and cross-sectional study carried out in four BHUs in the municipality of Teresina, capital of Piauí, called fast-track units, from August to November 2021.

The study participants were 114 frontline workers working in fast-track BHUs. All workers in the health categories were included, as well as in the administrative, general services and concierge sectors. Those who were away from their activities, due to leave or vacation, during the period of data collection were excluded.

Data were collected through a printed questionnaire, previously prepared by the study authors. The instrument addressed sociodemographic, occupational and performance-related variables during the COVID-19 pandemic. The questionnaire was self-administered and delivered to the researchers at the end of the work shift.

All participants had access to the Informed Consent Form (ICF), which was duly completed and signed by those who agreed to participate in the research.

The collected data were submitted to a double-entry process, using Microsoft Excel spreadsheets and subsequently exported and analyzed in the Statistical Package for the Social Science (SPSS) software, version 20.0.

In order to characterize the sample, descriptive statistics were performed, such as measures of central tendency (simple frequency, mean, and mode, median, minimum and maximum interval) and measures of dispersion (standard deviation). The Kolmogorov-Smirnov test was applied to continuous numerical variables to verify the assumption of normality.

To verify the association between qualitative variables, the chi-square test (χ^2) was used. The strength of the associations between the variables was measured by odds-ratio (OR) and confidence intervals (95% CI). The variables that in the bivariate analysis presented a fixed value of $p \leq 0.10$ were submitted to the multivariate model by multiple logistic regression.

To study the associations between quantitative variables, Spearman's correlation coefficient or Pearson's correlation test were used. The significance level of 5% was adopted for all analyses.

The study followed the ethical and legal assumptions that guide research with human beings, being carried out with the approval of the Research Ethics Committee of the State University of Piauí on April 21, 2021, with Opinion number 4.662.903 and Certificate of Presentation for Ethical Appreciation (CAAE) 45443621.9.0000.5209.

RESULTS

Considering the 114 questionnaires collected, there was a predominance of professionals in the nursing assistants/technicians category (21.1%), female (83.3%), aged between 30 and 49 years (41.2%), self-declared of brown color/race (61.7%). The sociodemographic and occupational characteristics are described in Table 1.

Table 1. Sociodemographic and occupational characterization of workers from fast-track basic health units. Teresina, PI, Brazil.

Variables	N	%
Professional category		
Cleaning/general services	10	8.8
Administrative helper	10	8.8
Dental Surgeon	11	9.6
Oral Health Technician	03	2.6
Nurse	18	15.8
Physician	11	9.6
Auxiliary/Nursing Technician	24	21.1
Community Health Agent	11	9.6
Concierge agent	04	3.5
Coordination	06	5.3
Pharmacist	06	5.3
Sex		
Male	19	16.7

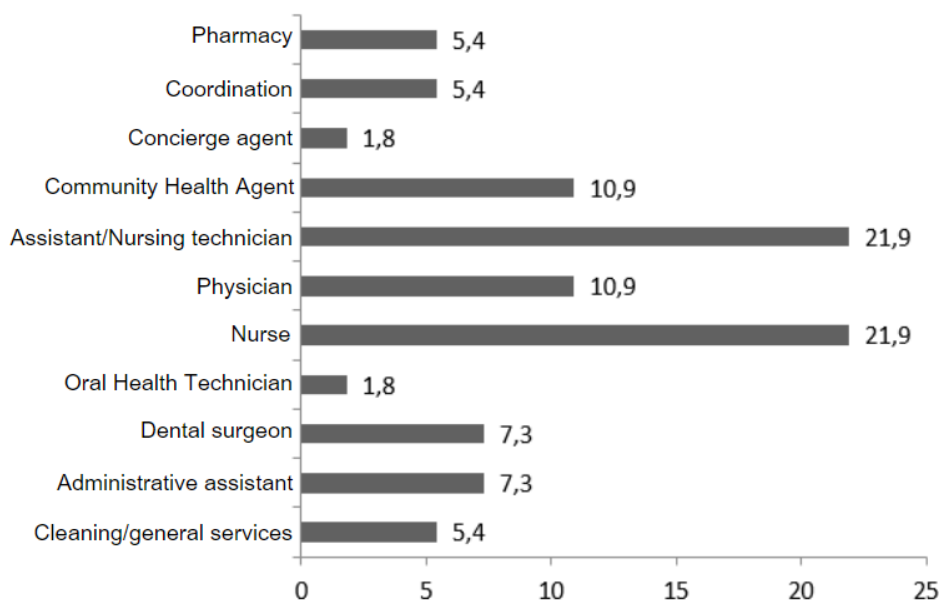
Female	95	83.3
Age		
20-29 years	20	17.5
30-39 years	47	41.2
40-49 years	26	22.8
50-59 years	19	16.7
60 years or more	2	1.8
Color/race		
White	11	9.6
Brown	71	61.7
Yellow	7	6.1
Black	11	9.6
No information	15	13.0
Total	114	100.0

Source: Prepared by the authors (2023).

Among the sample, 93.9% of workers were tested for COVID-19, and 48.2% received a positive diagnosis for the infection. The most widely used screening test was the rapid antigen test, performed by 66.5% of health workers. It is noteworthy that 5.3% of the study participants said they had never been tested for COVID-19 because they had no symptoms. As for having an employment relationship in another health institution, 57.9% reported that they did not.

Graph 1 shows the prevalence of coronavirus infection according to professional category. It was found that 21.9% of professionals in the nursing category, including technicians and nurses, had a higher prevalence of virus infection. The bivariate analysis showed statistical significance between these two variables ($p=0.014$).

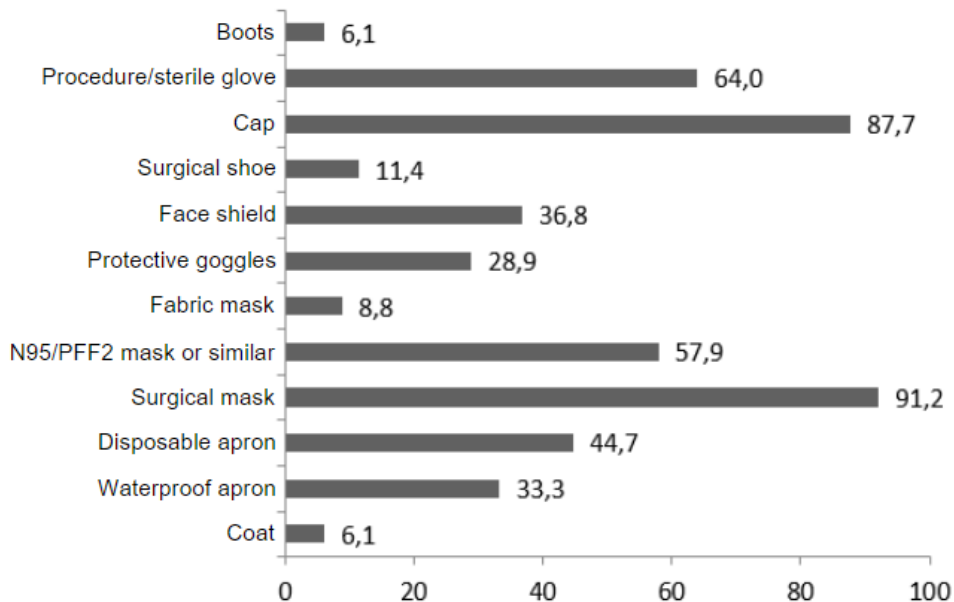
Graph 1. Prevalence of coronavirus infection according to the professional category of workers in fast-track basic health units. Teresina, PI, Brazil.



Source: Prepared by the authors (2023).

From Graph 2, the distribution of PPE for routine use used by health workers is observed. The most commonly used items were: surgical mask (91.2%), followed by caps (87.7%) and procedure/sterile gloves (64.0%).

Graph 2. Distribution of personal protective equipment¹ used by workers in fast-track basic health units. Teresina, PI, Brazil.



¹Multiple choice variable.

Source: Prepared by the authors, 2023.

As for the lack of these PPEs in health units, 57.9% of workers reported that there were no unavailable materials. However, some professionals reported that disposable and waterproof aprons, as well as procedure gloves, were among the materials most listed as unavailable. Workers were also asked about the impacts that the pandemic had on their health and professional life, with 64% feeling safe and protected with the PPE available.

Table 2 shows the association between the result of the COVID-19 test and occupational variables related to preventive care. It was evidenced among workers who tested positive for longer working hours, ranging from 40 to 59 hours per week and without work at night. Regarding preventive care, there was a predominance of specific places to put on (92.1%) and remove (86%) PPE, hand hygiene before putting on and after removing PPE (79.8%). They claimed to have participated in biosafety training for the placement and removal of PPE (57.9%) and hand hygiene (64%). Regarding the use of the N95 mask or similar by professionals, 28.9% said they did not use it. The bivariate analysis showed statistical significance between the variables result of the test for COVID-19 and use of the N95 mask ($p=0.020$).

Table 2. Association between COVID-19 test results and occupational variables and those related to preventive care in workers from fast-track basic health units. Teresina, PI, Brazil.

	Result COVID-19 testing			p^1
	Positive	Negative	Not tested	
Work hours				0.324
20 to 39 h weekly	20 (36.4)	17 (32.1)	1 (16.7)	
40 to 59 h weekly	23 (41.8)	28 (52.8)	5 (83.3)	
60h weekly and more	12 (21.8)	8 (15.1)	-	
Night work				0.548

Yes	11 (20.0)	15 (28.3)	1 (16.7)	
No	44 (80.0)	38 (71.7)	5 (83.3)	
Place to put PPE				0.714
Yes	51 (92.7)	49 (92.5)	5 (83.3)	
No	4 (7.3)	4 (7.5)	1 (16.7)	
Place to remove PPE				0.220
Yes	46 (83.6)	48 (90.6)	4 (66.7)	
No	9 (16.4)	5 (9.4)	2 (33.3)	
Hand hygiene before/after PPE				0.802
Before and after	52 (94.6)	50 (94.3)	6 (100.0)	
Only before	2 (3.6)	1 (1.9)	-	
Only after	1 (1.8)	-	-	
No	-	2 (3.8)	-	
Training for placement/withdrawal PPE				0.163
Yes	29 (52.7)	32 (60.4)	5 (83.3)	
No	26 (47.3)	21 (39.6)	1 (16.7)	
Training for hand hygiene				0.151
Yes	31 (56.4)	38 (71.7)	4 (66.7)	
No	24 (43.6)	15 (28.3)	2 (33.3)	
Use of N95 mask or similar				0.110
One Time	3 (5.4)	2 (3.8)	3 (50.0)	
Twice	2 (3.6)	2 (3.8)	-	
Three times	1 (1.8)	2 (3.8)	-	
Four times	2 (3.6)	-	-	
Five times or more	13 (23.6)	14 (26.3)	2 (33.3)	
Exchange according to integrity	13 (23.6)	12 (22.7)	-	
Does not use	21 (38.2)	21 (39.6)	1 (16.7)	
Total	55 (100.0)	53 (100.0)	6 (100.0)	

¹ Chi-square test or Fisher's test with significance of 0.05.

Source: Prepared by the authors (2023).

DISCUSSION

Regarding the characterization of the sample, it was observed that the results obtained are similar to those found in studies carried out in Barcelona with primary care workers, which showed a prevalence that ranged from 76.4% to 78.8%, respectively, of female professionals as the most affected by COVID-19. In addition, in a Dutch investigation, the age group between 41 and 50 years was identified as being the most affected by the new coronavirus, corroborating the findings of this study.⁽⁹⁻¹¹⁾

Regarding the predominant color/race, the results differ from those found in a study carried out in 2020, since it pointed to a majority who declared themselves as white color/race (40.2%). Thus, it can be inferred that the findings regarding the characterization of the sample are related to the health sector being constituted, for the most part, by the female workforce, young adults and self-declared of brown color/race.^(12,13)

The nursing team represents a significant portion of health workers, accounting for more than 2 million professionals in Brazil. Studies indicate that the nursing category represents the largest number of confirmed cases of COVID-19, confirming the findings of this research.^(14,15)

Therefore, these findings can be justified based on the premise that nursing professionals are the closest to health service users, thus being more exposed to the risk of contamination. In addition, according to the reality found in the study, the nursing professional is responsible for screening and testing, being in direct contact with the users and their secretions.⁽¹⁶⁾

The investigation identified that 94.7% of health workers underwent at least one test to detect COVID-19, of which 48.2% tested negative for the disease, a finding similar to those found in the literature, which indicated only a small portion of workers with positive results for the infection.⁽¹⁷⁻²⁰⁾

These results may be linked to the working conditions to which these workers are subjected, since the availability of adequate and quality PPE, training for the correct use of these inputs and a single employment relationship are essential factors for reducing exposure, and these favorable conditions were observed during the study.

Given the situation of extreme vulnerability to which health workers are subjected in relation to contamination by the new coronavirus, it is essential to be concerned by management and professionals themselves with protective measures to reduce this risk. Thus, it is necessary to ensure the availability of PPE necessary for the prevention of COVID-19, and that these inputs are of quality and guarantee the safety of the workers, in addition to the need for constant training on the proper form of use, for all those who work on the front line, either directly or indirectly.⁽²¹⁾

According to the data, it was found that PPE was not provided homogeneously to all servers, as a means of rationalizing inputs, where only those who were in direct contact with users (physicians, nurses, nursing technicians and dentists) were entitled to receive all the necessary equipment to ensure adequate protection. The other categories of workers used only the surgical mask and cap/beanie. In addition, receiving the equipment was not a guarantee of its use, since many workers chose not to use certain PPE due to physical discomfort and skin injuries caused by the PPE.

It was demonstrated that even with most workers using only a mask and cap/beanie, they still felt safe and protected with the PPE provided, not suffering any type of occupational accident during the pandemic period.

Most workers who tested positive exercised a workday of 40 to 60 hours per week. It can be inferred that the extensive workload makes servers more exhausted, which often leads to neglect of protective measures, in addition to contributing to increased exposure time and, consequently, influence on the chances of contracting the virus.⁽¹²⁾

According to evidence, the main way to prevent the spread of the new coronavirus is proper hand hygiene and the use of a mask, be it fabric, surgical or N95/similar. In the case of health workers, the most appropriate mask is N95/similar, as it is an PPE that protects the worker from inhaling aerosols and larger particles, in addition to ensuring greater safety due to adequate sealing, as they have a filter capable of reducing the inhalation of particles containing microorganisms.^(22,23)

There was a significant association between positive results and the non-use of the N95/similar mask, reiterating that the choices of the appropriate mask, in addition to good practices of use, guarantee greater safety to health workers. In the initial phase of the pandemic, the entire world began to suffer from the scarcity of PPE in the most varied health facilities, which often left workers with a high degree of exposure to the causative agent of COVID-19, providing assistance to suspected/confirmed patients usually with inadequate PPE, thus increasing their chances of contamination.⁽¹⁴⁾

In most of the BHUs investigated there was no shortage of these inputs, and when it occurred, they were replaced within a maximum interval of 48 hours. A reality that differs from that found in other studies, where there was a shortage of inputs in several health services. Scholars of the subject link this to panic and misinformation on the part of society that started to stock and irrational use of PPE contributing to shortages in health facilities.^(24,25)

The high demand for care in health services aimed at suspected cases of COVID-19, during data collection, presented itself as a limitation so that there was greater participation and adherence of professionals to the research. A significant part of the workers did not answer the questionnaire due to the intense flow of demands to be met. Another limitation is related to the study design, which was carried out in a certain context, which does not allow generalizing to the factors investigated in all professionals.

Nevertheless, the study contributed to the panoramic analysis of the main factors related to COVID-19 in primary care workers in the municipality of Teresina, working on the front line, which allows the elaboration of strategic actions aimed at the protection of these workers, focusing on improving their working conditions and less exposure to risks.

CONCLUSION

The results of the study show that there was a positive diagnosis for COVID-19 among workers, especially among those in the nursing category. Surgical masks, caps and gloves were the PPE most used

by professionals, most often available at the service. Participants stated that they had access to biosafety training. There was statistical significance between the variables test result for COVID-19 and use of N95 mask.

Ensuring access to protective equipment of sufficient quality and quantity, the rational use of these inputs, proper handling and disposal and actions aimed at avoiding the physical and emotional wear of these workers are fundamental strategies to overcome the crisis and preserve the health of these individuals.

It should be noted that because it is an etiological agent permeated by mutations, constant studies are necessary on the factors that contribute to morbidity and mortality rates in frontline workers, so that continuous recommendations can be developed to guarantee biosafety to this group, through the integration of the health sector with the scientific environment.

The study allowed a new look at health management, focused on themes related to workers' health, contributing to the improvement and critical perception of the professional and a practical view of the importance of strengthening public health policies regarding the appreciation of workers in their work environments.

CONTRIBUTIONS

Study conception or design: de Alencar SRS, Silva NMP. Data collection: de Alencar SRS, Silva NMP. Data analysis and interpretation: de Alencar SRS, Silva NMP, Barbosa NS, Ferreira JCSC. Writing the article or critical review: de Alencar SRS, Silva NMP, Barbosa NS, Ferreira JCSC, Silva JFT. Final approval of the version to be published: de Alencar SRS, Silva NMP, Barbosa NS, Ferreira JCSC, Silva JFT, Leal SMRDD

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