

ORIGINAL ARTICLE

Hand hygiene and mask use during the COVID-19 pandemic: analysis of agreement among primary care professionals

Higienização das mãos e uso de máscara na pandemia de COVID-19: análise de concordância entre profissionais da atenção primária

Higiene de manos y uso de mascarilla durante la pandemia de COVID-19: análisis de acuerdo entre profesionales de atención primaria

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ABSTRACT

Background and Objective: the COVID-19 virus is transmitted through direct or indirect contact with respiratory droplets or secretions from infected individuals. Measures such as hand hygiene and mask use are effective in preventing and controlling COVID-19 infection. The objective is to analyze the agreement on correct hand hygiene and the appropriate use of surgical masks among Primary Health Care professionals during COVID-19. **Methods:** a cross-sectional study conducted in Brazil, in a virtual environment, between August 2020 and March 2021. To respond to the research objective, 29 physicians, 29 nurses and 29 nursing technicians participated. The validated instrument “EPI-APS COVID-19” was used for data collection. The agreement analysis of the responses was performed in the Statistical Package for the Social Sciences using the Kappa coefficient. **Results:** the frequency of correct hand hygiene and mask use was low among professionals. Nursing technicians were the ones who showed the highest frequency of correct hand hygiene and adequate use of surgical mask compared to nurses and physicians. There was fair agreement between nurses and physicians regarding hand hygiene. There was substantial agreement between nurses and nursing technicians and between nurses and physicians, and moderate agreement between nursing technicians and physicians regarding mask use. **Conclusion:** the results highlight the need to implement and strengthen actions related to best hand hygiene practices and mask use by Primary Health Care professionals.

Keywords: COVID-19. Primary Health Care. Hand Desinfection. Personal Protective Equipment. Severe Acute Respiratory Syndrome Coronavirus 2.

RESUMO

Justificativa e Objetivo: a transmissão do vírus da COVID-19 se dá por contato direto ou indireto com gotículas respiratórias ou secreções de indivíduos infectados. Medidas como higienização das mãos e uso de máscaras são efetivas na prevenção e controle de infecção por COVID-19. Tem-se como objetivo analisar a concordância da higienização correta das mãos e do uso adequado de máscaras cirúrgicas entre profissionais da Atenção Primária à Saúde durante a COVID-19. **Métodos:** estudo transversal, realizado no Brasil, em ambiente virtual, entre agosto de 2020 e março de 2021. Para responder ao objetivo da pesquisa, participaram 29 médicos, 29 enfermeiros e 29 técnicos de enfermagem. Utilizou-se o instrumento validado “EPI-APS COVID-19” para a coleta de dados. A análise de concordância das respostas foi realizada no *Statistical Package for the Social Sciences* por meio do coeficiente Kappa. **Resultados:** a frequência de higienização correta das mãos e uso de máscara foi baixa entre os profissionais. Os técnicos de enfermagem foram os que apresentaram maior frequência de higienização correta das mãos e uso adequado de máscara cirúrgica em comparação aos enfermeiros e médicos. Houve concordância regular entre os enfermeiros e médicos em relação à higienização das mãos. Houve concordância substancial entre enfermeiros e técnicos de enfermagem e entre enfermeiros e médicos, e moderada entre técnicos de enfermagem e médicos em relação ao uso de máscara. **Conclusão:** os resultados evidenciam a necessidade de implementação e fortalecimento de ações relacionadas a melhores práticas de higienização das mãos e uso de máscara pelos profissionais da Atenção Primária à Saúde.

Descritores: COVID-19. Atenção Primária à Saúde. Higienização das Mãos. Equipamento de Proteção Individual. Coronavírus da Síndrome Respiratória Aguda Grave 2.

RESUMEN

Justificación y Objetivo: el virus COVID-19 se transmite por contacto directo o indirecto con gotitas o secreciones respiratorias de personas infectadas. Medidas como la higiene de manos y el uso de mascarillas son efectivas para prevenir y controlar la infección por COVID-19. El objetivo es analizar el acuerdo sobre la correcta higiene de manos y el uso adecuado de mascarillas quirúrgicas entre los profesionales de Atención Primaria de Salud durante la Covid-19. **Métodos:** estudio transversal, realizado en Brasil, en ambiente virtual, entre agosto de 2020 y marzo de 2021. Para responder al objetivo de la investigación, participaron 29 médicos, 29 enfermeros y 29 técnicos de enfermería. Para la recolección de datos se utilizó el instrumento validado “EPI-APS COVID-19”. El análisis de concordancia de las respuestas se realizó en el *Statistical Package for the Social Sciences* utilizando el coeficiente Kappa. **Resultados:** la frecuencia de correcta higiene de manos y uso de mascarilla fue baja entre los profesionales. Los técnicos de enfermería fueron quienes mostraron una mayor frecuencia de correcta higiene de manos y uso adecuado de mascarillas quirúrgicas en comparación con enfermeras y médicos. Hubo un acuerdo regular entre enfermeras y médicos sobre la higiene de manos. Hubo acuerdo sustancial entre enfermeras y técnicos de enfermería y entre enfermeras y médicos, y acuerdo moderado entre técnicos de enfermería y médicos respecto al uso de mascarilla. **Conclusión:** los resultados resaltan la necesidad de implementar y fortalecer acciones relacionadas con las mejores prácticas de higiene de manos y uso de mascarillas por parte de los profesionales de la Atención Primaria de Salud.

Palabras Clave: COVID-19. Atención Primaria de Salud. Desinfección de las Manos. Equipo de protección Personal. Síndrome Respiratorio Agudo Severo Coronavirus 2.

INTRODUCTION

The modes of transmission of SARS-CoV-2 (Severe Acute Respiratory Syndrome-Coronavirus-2) occur through contact with contaminated surfaces and/or people, droplets, aerosols and bodily fluids.¹ In this pandemic context, healthcare professionals, when providing direct care to suspected and confirmed patients,² need to adhere to personal protective equipment (PPE) use, such as surgical masks and hand hygiene (HH).³ Standard precautions (SP) are fundamental measures for the safety of healthcare professionals, and should be used in care and assistance of all patients.⁴

According to the Brazilian National Health Regulatory Agency⁴ and the Pan American Health Organization⁵, HH is an essential action for the prevention of all healthcare-associated infections (HAIs),⁶ including COVID-19.⁵ HH is considered one of the most effective practices in preventing and controlling infection, as it aims to eliminate transient microbiota.⁷ However, a study showed that HH is neglected by health workers in developed and developing countries, where the compliance rate for this measure was less than 20%.⁸ Low adherence to HH⁹ is due to the culture of non-hygiene at all times during care.¹⁰

Surgical mask use during the COVID-19 pandemic, since they are effective in reducing contamination,^{11,12} was recommended for carrying out procedures that generate droplets, in order to guarantee the protection and safety of professionals and users.³ However, this PPE quickly loses its effectiveness (around four hours) due to humidity.¹³ Furthermore, the incorrect use of PPE is still a worrying reality in healthcare services, compromising the safety and effectiveness of protective measures.⁹

Considering the above, in order to combat COVID-19, it was necessary to reinforce awareness among all professional categories regarding HH⁹ and surgical mask use³ to ensure adherence to these practices by the team, in order to minimize the risk of illness.⁷ Therefore, the study aimed to analyze the agreement on correct HH and the adequate use of surgical masks among Primary Health Care (PHC) professionals during COVID-19.

METHODS

This is a cross-sectional study carried out in all PHC units in Brazil between August 2020 and March 2021. This study is linked to the research “*Uso de Equipamentos*

de Proteção Individual pelos profissionais de saúde no combate a COVID-19 – EPICOVID-19 Brasil". The presentation of results followed the STrengthening the Reporting of OBservational studies in Epidemiology and CHEcklist for Reporting Results of Internet E-Surveys guidelines.

For the present study, the target population was all professionals in PHC units in Brazil (dentist, nurse, physiotherapist, speech therapist, nutritionist, pharmacist, social worker, psychologist, nursing assistant, nursing technician, physician, community worker, receptionist, technical administrative assistant, oral health technician and public health agent).¹⁴

The research was conducted in a virtual environment, using the free KoboToolbox platform. Various means of communication were used for dissemination, such as email, telephone contact and social media.¹⁴ After accepting the Informed Consent Form, access to the questionnaire was made available online.

For this study, only physicians, nurses, and nursing technicians were included. At the end of data collection, 29 physicians, 57 nurses, and 29 nursing technicians participated. To compose the sample for this study, the number of physicians and nursing technicians determined the sample size of nursing professionals. The 29 nurses selected were randomly selected through an online draw among those who voluntarily agreed to participate in the research.

For data collection, the validated instrument EPI-APS COVID-19 was used. The questions related to PPE use were organized into eight domains after psychometric validation and exploratory factor analysis, namely: 1 - disposable cap or hat; 2 - gloves; 3 - behavior and safety; 4 - N95 mask; 5 - HH; 6 - disposable apron or gown; 7 - disposable surgical mask; and 8 - glasses or personal protective mask.¹⁵

Domains 5 and 7 were used in this study, and their respective questions were: how often do you sanitize your hands before touching a user? How often do you sanitize your hands after risk of exposure to bodily fluids (e.g., saliva, phlegm, blood, urine)? How often do you sanitize your hands after touching a user? How often do you sanitize your hands after touching environments/surfaces/surroundings close to the user? In the last six months, how often have you reused a disposable mask in the PHC service where you work? Do you place the mask carefully to cover your mouth and nose, minimizing gaps between your face and the mask as much as possible? Do you remove the mask using the appropriate technique (i.e., not touching the front, but removing the tie or knot at the back, or pulling on the elastic that sits over the ears)?

The items were answered using a four-point Likert scale “never”, “rarely”, “almost always” and “always”, which were recoded dichotomously to define the score, namely: “no” (assigned the value of 0 points) for “never”, “rarely” and “almost always”; and “yes” (assigned the value of 1 point) for “always”. Correct HH and adequate use of surgical masks were considered to be the achievement of all points assessed in each domain, i.e., four points in the HH domain and three points in the disposable surgical mask domain.

After collection, the data were exported to Microsoft Office Excel[®] for database assessment and organization and, later, to the Statistical Package for the Social Sciences[®] version 21.0 for statistical analysis.

The Kappa coefficient was used to assess the agreement on the proper use of surgical masks and correct HH between physicians, nurses, and nursing technicians working in PHC. The agreement on the responses to items and domains was analyzed. The following parameters were considered to interpret the results: values above 0.80, almost perfect agreement; between 0.61 and 0.80, substantial agreement; between 0.41 and 0.60, moderate agreement; between 0.21 and 0.40, regular agreement; and below 0.21, slight agreement.¹⁶

The research was approved by the *Universidade Federal de Juiz de Fora* Research Ethics Committee on May 25, 2022, under Opinion 5.429.839, in accordance with Resolution 466/12, and Certificate of Presentation for Ethical Consideration 30933220.7.0000.5147, in 2020.

RESULTS

A total of 87 professionals participated in the study, including 29 nurses, 29 nursing technicians and 29 physicians. The mean age observed was 37.08 years, with a standard deviation of ± 9.9 , with the predominant age range being 19 to 36 years (49; 56.3%). Females were more prevalent (70; 80.5%). Most participants reported having a partner (54; 62.1%), and the Southeast region was predominant among participants (57; 65.5%) (data not shown in the table).

The frequency of correct HH and the appropriate use of surgical masks were low among professionals. Nursing technicians were those who presented a higher frequency of correct HH and appropriate use of surgical masks compared to nurses and physicians (Table 1).

Table 1. Frequency of correct hand hygiene and adequate use of surgical masks between nurses, nursing technicians and physicians in all federative units of Brazil, 2021

Domain	Nurses n (%)	Nursing technicians n (%)	Physicians n (%)
Hand hygiene			
Yes	11 (37.9)	15 (51.7)	9 (31.0)
No	18 (62.1)	14 (48.3)	20 (69.0)
Total	29 (100%)	29 (100%)	29 (100%)
Surgical mask			
Yes	3 (11.5%)	18 (78.3)	8 (36.4)
No	23 (88.5)	5 (21.7)	14 (63.6)
Total	26 (100%)	23 (100%)	22 (100%)

Agreement between nurses, nursing technicians and physicians regarding the HH and mask use domains was verified using the Kappa coefficient. The aim was to understand whether there was agreement on the best practices reported by participants in this study, with the achievement of the total number of points being assessed in each domain. Regarding the HH domain, fair and significant agreement was identified between nurses and physicians (Kappa = 0.39; p=0.03) (Table 2). Considering that HH is an essential measure for controlling HAIs, the moderate agreement indicates the need for interventions in order to improve adherence to HH among healthcare professionals.

Table 2. Agreement analysis related to the hand hygiene domain between nurses, physicians and nursing technicians (n=29) in all federative units of Brazil, 2021

	Professional category	Hand hygiene domain				
		Physicians		Nursing technicians		
		Yes	No	Yes	No	
Hand hygiene domain	Nurses	Yes	6	5	7	4
		No	3	15	7	11
		Kappa (p)	0.39 (0.03)		0.24 (0.20)	
	Nursing technicians	Yes	5	9	-	-
		No	4	11	-	-
		Kappa (p)	0.09 (0.60)		-	

Agreement related to the mask use domain between nurses and nursing technicians was substantial (Kappa = 0.83; p<0.0001), and between nurses and physicians (Kappa = 0.49; p=0.01) and nursing technicians and physicians was moderate (Kappa = 0.43; p=0.05) (Table 3). The findings of this analysis show a more uniform behavior of adherence to mask use among nursing team professionals. Mask use during the COVID-19 pandemic was an essential measure to ensure the safety of workers in the care context. The almost perfect agreement among nursing team professionals indicates the concern of workers with their own safety and the provision of safe and quality care.

Table 3. Agreement analysis related to the domain use of surgical masks between nurses, physicians and nursing technicians (n=29) in all federative units of Brazil, 2021

Professional category	Surgical mask domain	
	Physician	Nursing technician

			Yes	No	Yes	No
Surgical mask use domain	Nurse	Yes	3	0	3	0
		No	4	13	1	16
		Kappa (p)	0.49 (0.01)		0.83 (<0.001)	
	Nursing technician	Yes	4	1	-	-
		No	4	10	-	-
		Kappa (p)	0.43 (0.05)		-	

Regarding the agreement between the answers to the questions that make up the HH domain, agreement was only evidenced for “How often do you sanitize your hands before touching a user?”, being almost perfect between nurses and physicians (Kappa = 0.92; $p < 0.0001$), and moderate between nurses and nursing technicians (Kappa = 0.53; $p = 0.001$) and between nursing technicians and physicians (Kappa = 0.59; $p < 0.0001$). HH before contacting a user confirms healthcare professionals’ concern in providing safe and qualified care in the context of the COVID-19 pandemic. In relation to the agreement among the answers that make up the surgical mask domain between nurses, physicians and nursing technicians, no significant results were found.

DISCUSSION

This study presents an analysis of the agreement on correct HH and the appropriate use of surgical masks between physicians, nurses, and nursing technicians who worked in PHC services during COVID-19. Therefore, given the risk of contamination between professionals and those who provide care in PHC,³ adherence to SP by all during care is essential.^{4,18}

In a Chinese study carried out in 2020, physicians and nurses who treated patients with COVID-19 were assessed, and physicians were found to have a higher risk of infection due to their longer contact with patients.¹⁹ In research carried out in Brazil on the profile of deaths among healthcare professionals, the medical category surpassed the category of nurses, technicians and assistants.²⁰

The study revealed that nursing technicians reported a higher frequency of HH and mask use compared to physicians and nurses. These results support data from a cross-sectional study conducted in Brazil in 2022, in a private hospital, which analyzed the team’s adherence to HH practice. The categories of the aforementioned study also included nursing technicians, nurses, and physicians. Higher adherence was reported by nurses, and physicians had lower adherence.⁹

It is noteworthy that, although nurses and nursing technicians are part of the same professional category, the greater frequency of HH and mask use by nursing technicians may be related to the greater performance of procedures involving blood and other body fluids by this group of professionals, since, due to their role as team leaders, nurses are more focused on supervising these activities.²¹

Low adherence to HH by healthcare professionals may be linked to several factors, such as work overload, skin irritation, infrastructure, replacement of HH by gloves, knowledge gaps, forgetfulness and lack of supplies,⁹ and may also be attributed to the lack of incentive from managers to practice HH.⁹ Therefore, it is necessary to implement actions for professionals, in order to remedy deficiencies with regard to HH.⁹

In a literature review carried out in 2021, which verified adherence to HH by healthcare professionals, it was observed that medical professionals and nurses performed HH more frequently during the pandemic period, mainly after assisting patients.²² In this same study, nursing technicians were less adept at this practice. This situation is a warning, since these professionals deal with these patients in a comprehensive manner and for a longer period of time. When observing professionals as a whole, the frequency of HH increased during the pandemic. Therefore, it is essential to promote educational activities in order to encourage practice.²²

In this scenario, HH and mask use help reduce contamination by COVID-19³⁻¹¹ and also contribute to the prevention of HAIs.⁹ For this to happen, it is essential that such practices are followed by everyone.⁴ Mask use can promote collective and personal protection in the fight against the pandemic and other infectious diseases.¹²

In this study, the appropriate use of masks was higher among nursing technicians. In a study conducted in Brazil on mask use among healthcare professionals, nursing technicians obtained a higher score than nurses regarding mask use.²³ This result may be linked to the fact that nursing technicians provide direct care to patients, thus spending a long time close to them. This result shows that mask use is valued by this category.²³ However, guidance on the proper use and handling of masks should be provided to all healthcare workers.²⁰

When it comes to the medical category in this study, they had less adherence to the use of this PPE. In a cross-sectional study carried out in Brazil with medical professionals, nurses and nursing technicians, mask use was attributed mainly to the perception of the severity of the disease, but also to the perception of protection of this PPE against infection.¹¹ Therefore, masks are effective physical barriers in limiting short-

range transmission through direct or indirect contact and droplet dispersion.¹¹ According to Technical Note 04/20, updated on 03/31/2023, from the Brazilian National Health Regulatory Agency, mask use is recommended by all professionals in healthcare services. Furthermore, the note describes that masks should be used in contact with patients who are positive or suspected of having COVID-19 and in all situations in which the use of this PPE is necessary.³

The research has limitations related mainly to the low number of participants, which may have been influenced by the fact that data collection was carried out virtually, despite all efforts to ensure methodological rigor.¹⁴ Regarding data collection in virtual format, it is pertinent to mention the possibility that participants provided answers that do not reflect what actually happens in their daily work routine.

Despite this, the study presents relevant contributions to scientific knowledge in health and nursing. Among them, it is worth noting the agreement between the professional categories of nursing technicians, nurses, and physicians who reported HH and mask use during the COVID-19 pandemic. Moreover, the results highlighted the need to strengthen SP use in the service as well as promote HH and mask use at all times of care to prevent HAIs. Furthermore, there is a need for health courses to reinforce teaching on PPE use and HH, with greater awareness of these actions among medical students.

Therefore, it is recommended that professionals adopt ongoing education on the risks inherent to HAIs, in order to increase adherence and implementation of training activities on HH and mask use for different professional categories.

Thus, the study showed that, among the participating professionals, physicians and nurses were those who presented the lowest frequency of correct HH, as well as not using masks correctly and that the category with the best adherence to SP were nursing technicians.

It is important to reiterate that the recommendations for adherence to mask use and the performance of HH must be followed in the health sector by all professional categories and that promotion and strategies at all levels of healthcare are essential in order to guarantee the safety of professionals and users. It is suggested that new research be developed with a quantitative and qualitative approach on adherence to HH and the appropriate use of masks in different professional categories in the health context, with the aim of contributing to adherence of practices to prevent HAIs.

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Kelly Aline Rodrigues Costa contributed to bibliographic research, abstract writing, introduction, methodology, discussion, interpretation and description of results, preparation of tables, conclusions, review and statistics. **Ana Paula Mendes Carvalho** contributed to abstract writing, methodology, interpretation of results, conclusions,

review and statistics. **Camila Cristina Gregório de Assis** contributed to abstract writing, methodology, interpretation of results, conclusions, review and statistics. **Herica Silva Dutra** contributed to project management, bibliographic research, abstract writing, introduction, methodology, discussion, interpretation and description of results, conclusions, review and statistics. **Fernanda Moura Lanza** contributed to project management, bibliographic research, abstract writing, introduction, methodology, discussion, interpretation and description of results, conclusions, review and statistics. **Angélica da Conceição Oliveira Coelho** contributed to project administration, fund acquisition, literature search, abstract writing, introduction, methodology, discussion, interpretation and description of results, conclusions, review, and statistics.

All authors have approved the final version to be published and are responsible for all aspects of the work, including ensuring its accuracy and integrity.