



Adherence by nursing professionals to standard precautions in the COVID-19 pandemic

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ABSTRACT. It aimed to identify adherence to standard precautions by nursing professionals working in assistance during the COVID-19 pandemic. This is a pilot study with a cross-sectional design. The sample consisted of 169 nursing professionals. As for adherence to standard precautions, 157 (92.9%) participants claim to perform hand hygiene between care intervals. Regarding the use of gloves, most responded that they always wear them. The procedure that had the lowest adherence to standard precautions was intramuscular or subcutaneous injection (93/55%). The chi-square test (X^2) indicated that there was no association with educational level, nature of the work institution, nor length of work as a nursing professional. It was concluded that adherence to standard precautions was below the recommended ideal.

Keywords: universal precautions; nursing; personal protective equipment; Covid-19.

Received on December 13, 2021.

Accepted on May 13, 2022.

Introduction

Standard Precautions (SP) are procedures and measures to prevent infection transmission during patient care in healthcare settings, regardless of whether infection is suspected or confirmed. Besides protecting the professional against occupational hazards, SPs are also intended to protect patients against possible infectious agents carried in the hands of professionals or equipment used. Among other measures, SPs include hand hygiene (HH), the correct use of personal protective equipment (PPE) whenever there is a risk of contact with body fluids, and safe injection practice, considering the proper handling of sharp material and their disposal (Siegel, Rhinehart, Jackson, & Chiarello, 2007).

Most infections can be avoided through the adoption of simple measures, such as the use of PPE, in compliance with asepsis measures and adequate processing of articles and surfaces, which characterizes the system of precautions and isolation (Brasil, 2017).

As a risk prevention and control measure, we highlight the precautions characterized by hand hygiene, use of procedure gloves, gowns, surgical or N95 masks or equivalent, and protective goggles or face shield, whenever there is a risk of contact with body fluids. Additionally, there is the adoption of special care in cleaning and disinfecting surfaces, handling and disposal of sharp items. This set of behaviors also considers hygiene etiquette when coughing, sneezing, touching the eyes and nose, as well as the behavior of social interaction (Siegel et al., 2007).

Therefore, it is important to highlight that, besides having adequate equipment and facilities, health institutions shall have trained professionals, especially nursing professionals, to ensure the technical and scientific principles concerning the control of hospital infections (Valim, Pinto, & Marziale, 2017).

With the beginning of the accelerated and uncontrollable spread of the new coronavirus (COVID-19), in the city of Wuhan - China, at the end of 2019, a situation later characterized by the World Health Organization (WHO) as a pandemic (Zhou et al., 2020), there was even greater concern about adherence to SPs. In Brazil, the first case of infection with the virus occurred on February 26, 2020, in São Paulo, and the whole country was on the alert. Thus, hand hygiene measures, respiratory etiquette, use of masks, and social distancing and isolation were intensively reinforced by the mass media (Valente, 2020).

One of the greatest concerns during the pandemic refers to the high risk of exposure of health professionals to biological contaminants during care, especially for patients with COVID-19 (Ran et al., 2020).

It is observed that the work environment in the health area offers different risks to professionals, with the members of the nursing team being the most exposed (Carvalho & Luz, 2018) due to their role of direct and uninterrupted 24-hour care.

Thus, adherence to SPs shall complement the arsenal of behaviors for direct or indirect care to any client, regardless of their clinical or serological diagnosis of infection (Siegel et al., 2007). Adherence to asepsis principles and pre-exposure measures can avoid and/or minimize the risk of direct contact with air-, blood-, or other fluids-borne biological material (Pereira-Ávila et al., 2020). However, even in the pandemic period, there is scientific evidence that the adherence of health professionals to the basic donning principles is still a challenge, especially for nursing professionals, which remains suboptimal (Houghton et al., 2020).

With the COVID-19 pandemic, there was greater disclosure and dissemination of knowledge about safe health work practices. Thus, there is widespread dissemination that the control and decrease in the number of cases and deaths resulting from this pandemic can only be achieved with the mass adoption of fundamental measures that include the use of masks, hand hygiene (washing with water and soap or using hand sanitizer), basic hygiene etiquette, cleaning and disinfection of surfaces, avoidance of agglomerations, and maintenance of social distance (Oliveira, Lucas, & Iquiapaza, 2020). However, it is important to emphasize that, even in non-pandemic conditions, the adherence of health professionals to the practice of hand hygiene and the proper use of gloves is still low and very worrying, and should be constantly stimulated, since it is one of the pillars of infection prevention and control in health services (Pereira-Ávila et al., 2020).

Studies on the subject show that, to intervene in this situation, it is essential to understand care practices, in an attempt to propose actions consistent with the institutional and professional reality, including prevailing motivational and cultural aspects, to guarantee health safety and quality of care. The situational diagnosis of health professionals' performance regarding the compliance with the basic principles of asepsis (Pereira-Ávila et al., 2020) is required.

In this regard, considering the high risk of transmission, the expansion of the disease in the national territory, including the number of serious cases that culminated in deaths, the level of adherence to SPs by nursing professionals who work in care during the COVID-19 pandemic is questioned.

Therefore, this study aimed to: a) identify adherence to SPs by nursing professionals who work in care during the COVID-19 pandemic, and b) check the association between adherence to SPs and the level of education, nature of the work institution, and length of work as a nursing professional.

Method

Pilot, observational study with a cross-sectional design, guided by the tool *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE), being carried out from November 2020 to April 2021. This study was approved by the Research Ethics Committee of the Nursing School of the University of São Paulo in Ribeirão Preto (CEP-EERP/USP), with CAAE no. 38623520.6.0000.5393. Participation was voluntary, anonymous, and all participants had access to and completed the Free and Informed Consent Form (FICF) through an online form in the software Google forms®.

The sample consisted of nursing professionals (nursing assistants and technicians and nurses), aged ≥ 18 years, who worked in any health care services in the state of São Paulo - Brazil, during the COVID-19 pandemic. The sample size of this pilot study was defined by convenience, being the maximum number of participants who agreed to participate in the study during the six-month recruitment.

Participants' recruitment was carried out online, through an invitation posted weekly by the researchers, through social media such as Facebook®, Instagram®, LinkedIn®, and Whatsapp®. This invitation provided access to a planned form from the Google forms®, containing all the mandatory questions to be answered. To avoid duplication of responses, each participant was asked to provide their e-mail address.

Participants were asked to provide sociodemographic (sex, age, educational level, and occupation) and occupational (type and nature of the institution they work in, and length of time they have been performing nursing services) information, as well as to answer the Questionnaire of Adherence to Standard Precautions (SPQ), adapted and validated for Brazilian Portuguese (Valim, Marziale, Hayashida, Rocha, & Santos, 2015; Valim et al., 2017). This questionnaire consists of 20 questions on a Likert scale, ranging from 0 to 4 points, so that in questions 1 to 19, for each answer "always", "often", "sometimes", "rarely", and "never" 4, 3, 2, 1 and 0 points are added, respectively. For question no. 20, the score is performed inversely, that is, for the answer "always", "often", "sometimes", "rarely", and "never" 0, 1, 2, 3 and 4 points are added, respectively. The

closer the result obtained by the participant to the maximum score (80 points), the greater the adherence to SPs by this professional.

The results were checked based on the item Answers of the Google Forms® form and then interpreted through descriptive statistics and presented through absolute (n) and relative (%) frequency. Pearson's chi-square test (X^2) was used to find out the association between total adherence to the SPs (total score of 80 points by the SPQ) and educational level, nature of the work institution, and length of work as a nurse. Statistical analysis was performed using SPSS® version 23.0 with a significance level of $\alpha = 0.05$.

Results

This pilot study consisted of 169 nursing professionals who worked in health care services in the state of São Paulo - Brazil, during the COVID-19 pandemic. Sociodemographic and occupational data are described in Table 1.

Table 1. Distribution of research participants (n=169) according to sociodemographic and occupational variables. Sao Paulo, Brazil, 2020-2021.

Sociodemographic and Occupational Variables	n	%
Sex		
Female	126	74.5
Male	43	25.5
Age		
18 to 24 years	49	29.0
25 to 29 years	36	21.3
30 to 39 years	48	28.5
40 to 49 years	30	17.7
50 to 59 years	6	3.5
60 years or older	0	0.0
Educational level		
Elementary School	1	0.5
High school	27	16.0
University education	60	35.5
Graduate certificate, Master's or Doctorate degree	81	48.0
Occupation		
Nurse	125	74.0
Nursing technician	31	18.3
Nursing assistant	13	7.7
Type of institution of work		
General	68	40.2
University	7	4.1
District	18	10.6
Emergency Room	19	11.2
Long Stay Institution	1	0.6
Primary Health Unit	18	10.6
Home care	5	3.0
Obstetrics	10	6.0
Pediatrics	16	9.5
Surgical Clinic	2	1.2
Outpatient's	5	3.0
Nature of the work institution		
Public	79	46.8
Private	83	49.1
Public, private	7	4.1
Time working as a nurse		
Less than 1 year	44	26.0
Between 1 and 2 years	32	19.0
Between 3 and 4 years	20	11.8
Between 5 and 6 years	11	6.5
Between 7 and 8 years	11	6.5
Between 9 and 10 years	11	6.5
Between 11 and 15 years	12	7.1
Between 16 and 20 years	16	9.5
Between 21 and 30 years	11	6.5
Over 31 years	1	0.6

Regarding adherence to SPs, the average score obtained by nursing professionals, through the SPQ, was 70 points, with 38 and 80 being the minimum and maximum scores obtained. Table 2 shows the frequencies of responses by nursing professionals to the SPQ questions.

Table 2. Frequency of responses to the Questionnaire for Adherence to Standard Precautions by nursing professionals (n=169). Sao Paulo, Brazil, 2020-2021.

Question	Alwaysn (%)	Frequentlyn (%)	Sometimes n (%)	Rarely n (%)	Never n (%)
1. Performs hand hygiene in the interval between providing care to different patients.	157 (92.9)	11 (6.5)	1 (0.6)	0	0
2. Performs hand hygiene after removing gloves.	138 (81.6)	27 (16)	3 (1.8)	0	1 (0.6)
3. Washes hands immediately after contact with potentially contaminated biological materials.	165 (97.6)	4 (2.4)	0	0	0
Frequency report of the use of gloves in procedures in which there is a possibility of contact with potentially contaminated biological materials, listed below:					
4. Blood collection.	150 (88.8)	12 (7.1)	5 (2.9)	2 (1.2)	0
5. Procedures involving the possibility of contact with urine or feces.	160 (94.7)	5 (2.9)	4 (2.4)	0	0
6. Procedures involving the possibility of contact with the patient's non-intact skin.	139 (82.3)	21 (12.4)	7 (4.1)	2 (1.2)	0
7. Procedures involving the possibility of contact with the patient's mucosa.	154 (91.1)	10 (5.9)	4 (2.4)	1 (0.6)	0
8. Procedures involving the possibility of contact with secretions from the patient's airways.	158 (93.5)	8 (4.7)	2 (1.2)	1 (0.6)	0
9. Intramuscular or subcutaneous injection.	93 (55)	28 (16.7)	19 (11.2)	19 (11.2)	10 (5.9)
10. Carrying out dressings.	152 (89.9)	8 (4.7)	6 (3.6)	3 (1.8)	0
11. Cleaning to remove blood.	154 (91.1)	12 (7.1)	1 (0.6)	2 (1.2)	0
12. Venous puncture.	146 (86.4)	18 (10.6)	4 (2.4)	1 (0.6)	0
13. Contact with blood samples.	141 (83.4)	16 (9.5)	9 (5.3)	2 (1.2)	1 (0.6)
14. Uses a protective mask when there is a possibility of contact with a splash of blood, body fluid, secretion, or excretion.	135 (79.9)	23 (13.6)	10 (5.9)	1 (0.6)	0
15. Uses protective goggles when there is a possibility of contact with a splash of blood, body fluid, secretion, or excretion.	94 (55.6)	43 (25.4)	23 (13.7)	8 (4.7)	1 (0.6)
16. Uses protective apron when there is a possibility of contact with a splash of blood, body fluid, secretion, or excretion.	106 (62.8)	38 (22.5)	14 (8.2)	8 (4.7)	3 (1.8)
17. Uses caps and shoe covers when there is a possibility of contact with a splash of blood, body fluid, secretion, or excretion.	72 (42.7)	34 (20.1)	30 (17.7)	21 (12.4)	12 (7.1)
18. Does not perform active capping of used needles or passive capping of needles using one-handed technique.	89 (52.7)	22 (13.0)	20 (11.8)	13 (7.7)	25 (14.8)
19. Disposes of needles, blades, and other sharps in designated disposal containers.	166 (98.2)	3 (1.8)	0	0	0
20. After occupational accidents with potentially contaminated sharps, immediately squeezes the area, then performs antisepsis and applies a dressing.	57 (33.7)	13 (7.7)	13 (7.7)	7 (4.1)	79 (46.8)

The Chi-square test (X^2) indicated that there is no association between level of education, length of time working in nursing services, and nature of the institution in which they work with adherence to SP ($X^2 (1) = 0.033$; $p = 0.855$), ($X^2 (1) = 0.006$; $p = 0.940$), ($X^2 (2) = 1.031$; $p = 0.597$), respectively.

Discussion

The present study, when investigating, through the SPQ, the level of adherence to SPs by nursing professionals during the COVID-19 pandemic, showed a general considerable deficit in the adoption of such measures during health care practice, especially with regard to hand hygiene, use of PPE, and the handling of

sharp materials. These data were considered worrying, in view of the health crisis caused by the COVID-19 pandemic, which was experienced by these professionals at the time of this survey.

Due to the possible means of transmission and spread of COVID-19, which can range from direct to indirect contact, droplets (Rothan & Byrareddy, 2020), and even aerosols (Liu et al., 2020), hand hygiene at the times recommended by the WHO and the use of adequate PPE become fundamental for the nursing professionals' occupational safety, as they are in constant and direct contact with the patient during care activities. These measures can also prevent and control cross-transmission in health services, which is a key factor for the quality of care (Organização Mundial da Saúde [OMS], 2005).

As the COVID-19 pandemic progresses, the World Health Organization has developed eight pillars of public health response, with the sixth pillar, "Infection Prevention and Control (IPC)", setting targets for nations to review and improve measures to control the spread of the disease. Requirements include functional screening, isolation rooms, trained health staff, sufficient and adequate PPE, and HH locations and supplies (World Health Organization [WHO], 2020).

According to Technical Note No. 04/2020 of the National Health Surveillance Agency¹⁶, updated in February 2021, the SPs to be followed for the care of all patients (diagnosed or not with COVID-19) include: hand hygiene, use of a face protection mask, gloves, apron, cap, and goggles, as well as a sharps disposal box. This same Technical Note emphasizes that training regarding the prevention of SARS-CoV-2 transmission shall be provided to all health professionals. In this context, the low adherence to the use of face protection masks during the provision of care by these professionals stands out, which can be seen by the frequency of only 79.9% of the answer "always" to the question "wears a protection mask when there is a possibility of contact with splash of blood, body fluid, secretion, or excretion". Although we did not question about the units in which these professionals worked at the time of the investigation, which may not be directed exclusively to the care of patients suspected or confirmed for COVID-19, SPs shall always be adopted by all professionals, regardless of the diagnostic confirmation of the patient. It should also be noted that despite data collection in this investigation having been carried out during the course of the COVID-19 pandemic, other viral, bacterial, and fungal infections did not cease to coexist, and even after the suppression of the current pandemic, adherence to SP measures shall, under no circumstances, be abandoned (OMS, 2005).

Moreover, one shall also consider the availability and adequate supply of PPE by both public and private health services, which are also subject to lack of material and financial resources, especially during epidemic periods. However, the present study did not identify any association between the nature of the institution where nursing professionals work and adherence to SPs in its entirety. Despite the working conditions provided, it is still of paramount importance to provide training to professionals as to SP measures, aiming at greater effectiveness in aspects related to biosafety, since, for example, the scientific literature shows the positive impacts of these interventions in what refers to protective clothing (WHO, 2020). By this means, continuing education, inserted in the work environment, appears as a possible alternative for SPs to constantly enter health professionals' routine. This can be corroborated, whereas, although almost half of the nursing professionals participating in the present investigation had some type graduate certificate, master's degree and/or even a doctorate degree, there was no statistically significant association between level of education and total adherence to SPs. In addition, the work length of time performing nursing services was also not statistically significant in what regards total adherence to SPs. This way, it is noted that only educational level or professional experience are not sufficient factors to ensure safe and evidence-based care, with investment by the institutions in continuing education being required.

A cross-sectional, correlational, and descriptive study using instruments to assess knowledge and application of SPs in the work environment highlighted the importance of continuing education. A total of 172 nursing professionals participated and psychosocial and organizational factors evidenced adherence to the use of PPE, to the prophylaxis after exposure to the patient's body fluids, and to vaccination against hepatitis B (Souza et al., 2020).

This research has limitations, mainly due to the study design chosen (cross-sectional type), which does not allow subjects' follow-up. Another point is related to the fact that the instrument was applied online, and was answered by the participants themselves, which may not fully reflect the reality of adherence to the SPs. Even with the preliminary results of this pilot study, a current picture could be observed of the adherence to SPs by nursing professionals working in different contexts of care in the state of São Paulo. The findings of our study can serve as a starting point for public and private health agencies to propose strategies to strengthen adherence to SPs, minimizing the risk of infection for professionals and patients.

Conclusion

A deficit in adherence to SPs by nursing professionals during the COVID-19 pandemic was identified. In addition, there was no association with the level of education, nature of the work institution, nor length of work as a nursing professional.

When the topic of infections related to occupational health and safety is discussed, infection prevention and control measures shall be a constant adopted by all members of the health team, with adherence to SPs being a goal to be set and always achieved, especially with regard to periods of health crises.

Acknowledgements

The present study was carried out with the support of the Coordination for the Improvement of Higher Education Personnel - Brazil (CAPES) - Financing Code 001. It also had the support of the Unified Scholarship Program of the University of São Paulo (PUB/USP – public notice 2020-2021).

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