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## KNOWLEDGE AND ADHERENCE OF THE NURSE TO STANDARD PRECAUTIONS IN CRITICAL UNITS

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### ABSTRACT

**Objective:** to identify the knowledge and adherence of nurses to the standard precautions in critical care units.

**Method:** descriptive and cross-sectional study, with a quantitative approach, with the population of nurses from a university hospital in the Distrito Federal, Brazil. For data collection, three instruments were used. A semi-structured questionnaire with identification and occupational data of nurses, the questionnaire to evaluate knowledge to standard precautions and the Questionnaire of adherence to standard precautions. Descriptive analysis was used with absolute and relative frequency values.

**Results:** the population was composed of 40 participating nurses, 75% were female, with an average age of 32.5 years, ranging from 24 to 50 years. Professionals with five or more years of training (67.5%) predominated, 25 (62.5%) had only one job and had experience in the area of critical patient care for more than three years. Although with a high percentage of accuracy, with regard to the moments that required hand hygiene, this frequency was 97.5%. Gloves are always used for intramuscular or subcutaneous injection by 67.5% of professionals, but 17.5% still consider it unnecessary to wear disposable caps and surgical shoe covers. The use of sharps, handling and reporting of occupational accidents were not performed as expected.

**Conclusion:** gaps were identified in relation to the knowledge and adherence of nurses in units that provide care to critical patients of a university hospital with regard to standard precautions.

**DESCRIPTORS:** Intensive care units. Nurses. Universal precautions. Training. Health knowledge, attitudes, practice.

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# CONHECIMENTO E ADESÃO DO ENFERMEIRO ÀS PRECAUÇÕES PADRÃO EM UNIDADES CRÍTICAS

## RESUMO

**Objetivo:** identificar o conhecimento e a adesão de enfermeiros às precauções padrão em unidades de atendimento a pacientes críticos.

**Método:** descritivo e transversal, com abordagem quantitativa, com a população de enfermeiros de um hospital universitário do Distrito Federal, Brasil. Para a coleta de dados, utilizou-se, três instrumentos. Um questionário semiestruturado com dados de identificação e ocupacionais dos enfermeiros, o questionário de conhecimento às precauções-padrão e o Questionário de adesão às precauções padrão. Foi utilizada a análise descritiva com valores de frequência absoluta e relativa.

**Resultados:** a população foi de 40 enfermeiros participantes, 75% eram do sexo feminino, com média de idade de 32,5 anos, variando entre 24 e 50 anos. Predominou a participação de profissionais com cinco anos ou mais de formados (67,5%), 25 (62,5%) possuíam apenas um emprego e tinham experiência na área de assistência a pacientes críticos há mais de três anos. Embora com alto percentual de acerto, quanto aos momentos que exigiam higienização das mãos, essa frequência ficou em 97,5%. Luvas são sempre usadas para aplicação de injeção intramuscular ou subcutânea por 67,5% dos profissionais, mas 17,5% ainda consideram dispensável o uso de gorros e propés descartáveis. O uso de materiais perfurocortantes, o manejo e a notificação de acidentes de trabalho não foram realizados como esperado.

**Conclusão:** foram identificadas lacunas em relação ao conhecimento e à adesão dos enfermeiros em unidades que prestam cuidado a pacientes críticos de um hospital universitário no que se refere às precauções padrão.

**DESCRIPTORIOS:** Unidades de terapia intensiva. Enfermeiras e enfermeiros. Precauções universais. Capacitação. Conhecimentos, atitudes e práticas em saúde.

# CONOCIMIENTO Y ADHESIÓN DEL ENFERMERO A LAS PRECAUCIONES ESTANDARIZADAS EN UNIDADES CRÍTICAS

## RESUMEN

**Objetivo:** identificar el conocimiento y la adhesión de enfermeros a las precauciones estandarizadas en unidades de atención a pacientes críticos.

**Método:** descriptivo y transversal, con abordaje cuantitativo, con una población de enfermeros de un hospital universitario del Distrito Federal, Brasil. Para la recolección de datos, se utilizaron tres instrumentos. Una encuesta semiestructurada con datos de identificación y ocupación de los enfermeros, una encuesta sobre el conocimiento de las precauciones estandarizadas y la Encuesta de adhesión a las precauciones estandarizadas. Se utilizó el análisis descriptivo con valores de frecuencia absoluta y relativa.

**Resultados:** participaron 40 enfermeros, de los cuales 75% eran del sexo femenino, con una media de edad de 32,5 años, que varía de 24 a 50 años. Predominó la participación de profesionales con cinco años o más de formación (67,5%); 25 (62,5%) poseían solo un empleo y tenían experiencia en el área de la asistencia a pacientes críticos hace más de tres años. Aunque hubo un número elevado de acierto, respecto a los momentos que exigían la higiene de manos, esta frecuencia estuvo en 97,5%. Los guantes siempre se utilizan para administrar inyecciones intramuscular o subcutánea en el 67,5% de los profesionales, pero 17,5% aún consideran dispensable el uso de gorros y cubierta de pies descartables. El uso de materiales corto-punzantes, el manejo y la notificación de accidentes laborales no se realizaron conforme lo esperado.

**Conclusión:** se identificaron carencias en relación al conocimiento y a la adhesión de los enfermeros en unidades que prestan cuidado a pacientes críticos de un hospital universitario en lo que se refiere a las precauciones estandarizadas.

**DESCRIPTORIOS:** Unidades de cuidados intensivos. Enfermeros. Precauciones universales. Capacitación. Conocimientos, actitudes y práctica en salud.

## INTRODUCTION

The Ordinance of the Ministry of Health nº 2.616, of May 12, 1998, defines hospital infection (HI) as: “is the one acquired after admission of the patient and that manifests during hospitalization or after discharge, when it may be related to hospitalization or hospital procedures”.<sup>1,1</sup>

The intensive care unit (ICU) and the other sectors that serve critical patients stand out as places where there is a higher risk for HI acquisition and dissemination of bacterial resistance, due to the characteristics of these places, type of patient, high frequency of use of antibiotics, professional/patient contact and rupture of the tissue barrier of patients by invasive procedures.<sup>2</sup>

Currently, HIs are a global problem and represent one of the main causes of morbidity-mortality associated with clinical, diagnostic and therapeutic procedures. In addition to patients, this problem is equally important for health professionals who are continuously subject to occupational hazards. In view of this continuous situation, intervention strategies were proposed to minimize it, including the implementation of standard precautions.<sup>3</sup>

Standard precautions are basic measures to prevent transmission of infections during patient care in all health care settings and for all patients regardless of whether there is suspicion or confirmation of infection.<sup>4</sup> In addition to protecting the professional against occupational hazards, the standard precautions are also intended to protect patients against possible infectious agents carried in the hands of professionals or equipment used. They include hand hygiene (HH); correct use of personal protective equipment (PPE) (gloves, apron, mask, protective glasses and/or face shield); and Safe Injection Practices.<sup>4-5</sup>

To these standard precautions, the *Centers for Disease Control and Prevention* (DCP) still added other measures: respiratory or cough hygiene etiquette, safe injection practices and use of protective masks for insertion of catheters or injections involving lumbar puncture.<sup>4,6</sup>

Most infections can be avoided by adopting simple measures, such as the use of PPE, in compliance with measures of asepsis and adequate processing of items and surfaces, which characterizes the system of precautions and isolation proposed by the DCP.<sup>4,6</sup> This system is based on three levels, starting with the standard and specific precautions based on the mode of transmission and applied to patients under suspicion or with a confirmed diagnosis of infection or colonization by important microorganisms. These include contact precautions (with skin and/or contaminated surfaces) and respiratory precautions, either by droplets and/or aerosols. There is a third level, called empirical precautions, indicated for clinical syndromes that have epidemiological importance, but without confirmation of etiology.<sup>7</sup>

However, in addition to adequate knowledge of the recommendations for prevention and control of infections with regard to the transmission modes and prevention of the dissemination of microorganisms among health professionals, it is indispensable the adherence of the professional, through the correct use of precautionary measures and isolation.<sup>2,8</sup> Thus, in order to ensure the good health of the patient, the health team professionals play an essential role in the control of infection, adopting preventive measures even before hospitalization, in order to avoid unnecessary hospitalizations.<sup>9</sup>

Thus, it is important that, besides having the necessary/adequate equipment, health institutions should have professionals trained to guarantee the technical and scientific principles concerning the control of HIs, especially nurses.<sup>9</sup> It is emphasized that the nurse stands out for representing the nursing team and being present 24 hours a day in patient care.

Thus, it is noticed that the use of precautions as a whole seeks to reduce the risk of exposure of patients and professionals to pathogens causing infection. In this sense, nurses and other members

of the nursing team are more vulnerable due to the time of contact with the patients, requiring the necessary knowledge about the types of precautions indicated for a harmless assistance.<sup>10</sup>

Although the literature has shown that SPs are well defined and complete, in practice it is still difficult for nursing professionals to adhere to them in their entirety.<sup>8</sup>

Thus, this study aimed to identify the knowledge and adherence of nurses to standard precautions in critical care units.

## METHOD

This is a descriptive and cross-sectional study, with a quantitative approach, carried out in a public hospital, which has medium and high complexity services in line with the Unified Health System (*Sistema Único de Saúde - SUS*), as well as teaching, research and extension activities, located in the Distrito Federal. This hospital has two units dedicated to the care of critical patients: one ICU and one critical care unit (CCU), a semi-intensive unit, with 10 and 33 beds, respectively. At the time of the study, the ICU had in its staff, nine nurses in the unit, while the CCU had 35 nurses.

The population was made up of the nurses who work in these two units, and the sample consisted of 40 participants. Considering the size of the population, it was decided to work with the total number of nurses, with no sample calculation. To participate, the professional should meet the inclusion criterion of acting in one of the units chosen for the study for at least three months. Professionals dismissed from service for any reason during the period of data collection were excluded.

Data collection was done by the researchers themselves and occurred between June and September of 2016. The nurses who accepted to participate in the present study, after reading, signed the written informed consent (WIC). The professionals were approached and interviewed during their shift and place of work, according to their availability. Data were collected from three instruments. The first was a semi-structured questionnaire prepared by the researchers, including identification and occupational variables: gender, age, training time, work shift, number of jobs, working time in the institution, ICU/CCU work at the ICU/CCU of the study institution. For evaluation of knowledge and adherence to the standard precautions, the Standard Precautions Knowledge Questionnaire (SPKQ) and the Standard Precaution Adherence Questionnaire (SPAQ), respectively, were used. These questionnaires (SPKQ and SPAQ) were validated and translated into Brazilian Portuguese.<sup>8-9</sup>

The SPAQ has 20 questions on the basic concept of standard precautions and the contents and practical requirements related to them, with three options of answer (True, False and I do not know). Among the 20 questions, questions 2,3,6, 9 and 19 are considered false and the others, true. For each correct answer, the value of one point is assigned. The total score (maximum of 20 points) obtained is directly related to the individual's knowledge about the standard precautions, that is, the greater the value, the greater his knowledge.

In the SPAK, also composed of 20 questions, the answers are given in Likert scale, with 5 answer options, which receive different scores: Always - 4 points, Often - 3 points, Sometimes - 2 points, Rarely - 1 point, and Never - 0 point. The exception is the question number 20, which is a reverse item (Always - 0 point, Often - 1 point, Sometimes - 2 points, Rarely - 3 points, and Never - 4 points). The final score (maximum of 80 points) is as greater as the adherence of the individual to SP.

The database was built on Excel for Windows 2010, double entry being performed. The analysis relied on the descriptive method, with absolute (n) and relative (%) frequency values.

## RESULTS

Of the 40 nurses who participated in the study, 31 (77.5%) worked at the CCU, the majority were female (75.0%) and the average age was 32.5 years, ranging from 24 to 50 years. The demographic and occupational profile of the nurses is presented in (Table 1). Predominated professionals with up to 10 years of training (77.5%) and the work shift that concentrated the largest number of these workers was the night shift (40.0%). Nearly 2/3 of the interviewed (62.5%) had only one job and had experience in the area of critical patient care for more than three years.

Considered alone, the ICU presented an average of 18.0 (out of 20 total) points in the SPKQ and the CCU of 17.6 points; while the average of the two units together was 17.7 points.

**Table 1** – Distribution of research participants according to sociodemographic and occupational variables. Brasília, DF, Brazil, 2016. (N=40)

Socio-demographic and occupational variables	N	%
Age		
≤ 30 years	22	55.0
> 30	18	45.0
Gender		
female	30	75.0
male	10	25.0
Time of training		
up to 5 years	13	32.5
over 5 years	27	67.5
Work shift		
6 hours daytime	10	25.0
12 hours daytime	14	35.0
12 hours nighttime	16	40.0
Number of jobs		
one	25	62.5
two	12	30.0
three or more	3	7.5
Working time at the institution*		
Up to 1 year	14	35.9
greater than 1 and less than 3 years	22	56.4
3 years or more	3	7.7
Working time in Intensive Care Unit/Critical Care Unit (ICU/CCU)		
up to one year	9	23.7
greater than one and less than three years	17	44.7
three years or more	12	31.6
Working time at the Intensive Care Unit/Critical Care Unit (ICU/CCU) investigated†		
up to one year	16	42.1
greater than one and less than three years	20	52.6
three years or more	2	5.3

\* one individual did not answer; † two individuals did not answer

Table 2 shows that although all the participants answered question 1 of SPKQ stating that they know what standard precautions are, 27 (67.5%) of them consider that these are mainly intended to protect the health of staff. The interviewees were unanimous in stating that they should wash their hands immediately after contact with blood or other potentially contaminated materials and 39 (97.5%) stated that it is necessary to clean their hands after removing the gloves, but three (7.7%) professionals judged not to know and/or it was not necessary to sanitize their hands during the care of different patients.

Regarding the use of PPE, almost all participants recognize the need for gloves (95.0%), face mask and/or face shield (97.5%), protective glasses (100.0%) and apron (97.5%) for performing procedures in which there is the possibility of blood splatters, body fluid, secretion or excretion, but 17.5% of them still consider the use of disposables hat and surgical shoe to be unnecessary.

**Table 2** – Frequency of answers to the Knowledge Questionnaire to standard precautions by the nurses interviewed. Brasília, DF, Brazil, 2016. (N=40)

Questions*	True	False	Do not know
	n(%)	n(%)	n(%)
1. You know what standard precautions are†	39(100.0)	0.0	0.0
2. Standard precautions should only be used in patients diagnosed with infection or patients who are in the incubation period for a given infection†	2(5.1)	37(94.9)	0.0
3. Adherence to standard precautionary measures is primarily aimed at protecting health staff.	27(67.5)	13(32.5)	0.0
4. When in contact with blood or other potentially contaminated materials should wash your hands immediately.	40(100.0)	0.0	0.0
5. Hand hygiene should be performed while providing care to different patients†	36(92.3)	2(5.1)	1(2.6)
6. Since the use of gloves can prevent contamination of hands, it is not necessary to sanitize the hands after removing the gloves.	1(2.5)	39(97.5)	0.0
7. Contact with objects, materials, equipment, clothing and individuals with contaminated Personal Protective Equipment should be avoided.	36(90.0)	3(7.5)	1(2.5)
8. The use of Personal Protective Equipment should not be shared.	36(90.0)	2(5.0)	2(5.0)
9. When performing oral care procedures or other procedures that may involve contact with mucous membranes of the patient, the use of gloves is not mandatory.	0.0	40(100.0)	0.0
10. In blood collection or venipuncture procedures, the use of gloves is necessary.	39(97.5)	0(0)	1(2.5)
11. In the procedures in which there are possibilities of contact of the hands with secretion or excretion of patients, the use of the gloves is necessary.	38(95.0)	1(2.5)	1(2.5)
12. Gloves should be replaced when providing care to different patients.	39(97.5)	1(2.5)	0.0
13. In procedures where there are possibilities of blood splatters, body fluid, secretion or excretion, protective mask or facial protector should be used.	39(97.5)	1(2.5)	0.0
14. In procedures where blood splatters, body fluid, secretion or excretion are likely to occur, it should be woreed personal protective glasses or face shields.	40(100.0)	0.0	0.0



**Table 2 – Cont.**

Questions*	True	False	Do not know
	n(%)	n(%)	n(%)
15. In procedures where blood splatters, body fluid, secretion or excretion are likely to occur, the protective apron should be used.	39(97.5)	1(2.5)	0.0
16. In situations where blood splatters, body fluid, secretion or excretion are likely to occur, disposable hats and surgical shoe should be used.	33(82.5)	6(15.0)	1(2.5)
17. It is forbidden to bend, twist, or perform the active encapsulation of needles. When necessary, perform the passive encapsulation with only one hand. Containers for disposal should be near the handling area.	31(77.5)	8(20.0)	1(2.5)
18. When providing nursing care to patients with hepatitis C or syphilis, it is necessary to adopt only the standard precautionary measures.	34(85.0)	6(15.0)	0.0
19. When providing nursing care to patients with active tuberculosis or chickenpox, standard precautions should be taken in addition to precautionary measures for droplets.†	13(33.3)	26(66.7)	0.0
20. When providing nursing care to patients with intestinal infections or skin infections, it is necessary to adopt the standard precautionary measures in addition to the contact precautionary measures.	34(85.0)	5(12.5)	1(2.5)

\*Questions from the Knowledge Questionnaire to standard precautions;<sup>9</sup> †One individual did not answer this question.

Regarding the correct handling and disposal of sharp materials (question 17), 22.5% of the participants were mistaken and/or did not know how to answer. In addition, there were doubts regarding other types of precautions, contact precautions and respiratory precautions (droplets and aerosols), as perceived in questions 18, 19 and 20, in which, although with a large number of correct answers, many nurses answered incorrectly.

In the descriptive analysis of the SPAQ (maximum of 80 points), the ICU presented an average of 75.3 points and the CCU, 71.4, while the average adherence between the units was 72.3 points, varying between 61 and 80 points.

As for adherence to standard precautions, Table 3 shows that, in relation to the moments in which they always perform the HH, 80.0% of the nurses do it in the interval between care for different patients, 90.0% after removing the gloves and 100.0% after contact with potentially contaminated biological materials. Regarding the use of gloves to perform procedures in which there is a possibility of contact with potentially contaminated biological materials, it is observed that the adherence of nurses is almost total (97.5%) in the following situations: blood collection, procedures involving possibility of contact with urine or feces, possibility of contact with patient's non-integral skin and/or secretions from the airway of the patient, dressing and cleaning for blood removal. However, there are still professionals who do not always use this PPE in procedures that involve the possibility of contact with the mucosa of the patient (5.0%); venous puncture (10.0%); to handle blood samples (12.5%) and for intramuscular or subcutaneous injection (32.5%).

The percentage of nurses who still do not always use the other PPE to perform procedures with possibility of contact with blood splash, body fluid, secretion or excretion was 15.0% for mask, 55.0% for protection apron, 70.0% for protective glasses and 82.5% for disposable hats and surgical shoe.

Less than half (47.5%) of the participants already adhered to the behavior of never performing active encapsulation of used needles or performing only the passive encapsulation (using only one



hand), but the handling and disposal of sharp materials is made in the correct way by 100.0% of professionals. And when work-related accidents occur with potentially contaminated sharps, only 25.6% of them reported never squeezing the site immediately, doing antisepsis and putting on a bandage.

**Table 3** – Frequency of responses to the Nurses' standard precautions adherence questionnaire. Brasília, DF, Brazil, 2016. (N=40)

Variable*	Always	Frequently	Some times	Rarely	Never
	N (%)	N (%)	N (%)	N (%)	N (%)
1. I perform hand hygiene in the interval between providing care to different patients.	32 (80.0)	8 (20.0)	0.0	0.0	0.0
2. I perform hand hygiene after removing the gloves.	36 (90.0)	4 (10.0)	0.0	0.0	0.0
3. I wash hands immediately after contact with potentially contaminated biological materials.	40 (100.0)	0.0	0.0	0.0	0.0
Frequency of glove use in procedures where there is a possibility of contact with potentially contaminated biological materials:					
4. Blood collection	39 (97.5)	1 (2.5)	0.0	0.0	0.0
5. Procedures involving the possibility of contact with urine or feces	39 (97.5)	1 (2.5)	0.0	0.0	0.0
6. Procedures involving the possibility of contact with the patient's non-integral skin	39 (97.5)	1 (2.5)	0.0	0.0	0.0
7. Procedures involving the possibility of contact with the patient's mucosa	38 (95.0)	2 (5.0)	0.0	0.0	0.0
8. Procedures involving the possibility of contact with secretions of the airway of patient	39 (97.5)	1 (2.5)	0.0	0.0	0.0
9. Intramuscular or subcutaneous injection	27 (67.5)	6 (15.0)	6 (15.0)	1 (2.5)	0.0
10. Dressing	39 (97.5)	1 (2.5)	0.0	0.0	0.0
11. Cleaning for blood removal	39 (97.5)	1 (2.5)	0.0	0.0	0.0
12. Venous puncture	36 (90.0)	4 (10.0)	0.0	0.0	0.0
13. Contact with blood samples	35 (87.5)	3 (7.5)	2 (5.0)	0.0	0.0
14. I use protective mask when there is possibility of contact with blood splash, body fluid, secretion or excretion	34 (85.0)	4 (10.0)	1 (2.5)	1 (2.5)	0.0
15. I wear protective glasses when there is a possibility of contact with blood splash, body fluid, secretion or excretion	12 (30.0)	11 (27.5)	13 (32.5)	4 (10.0)	0.0
16. I use protective apron when there is possibility of contact with blood splash, body fluid, secretion or excretion	18 (45.0)	15 (37.5)	4 (10.0)	3 (7.5)	0.0

Table 3 – Cont.

Variable*	Always	Frequently	Some times	Rarely	Never
	N (%)	N (%)	N (%)	N (%)	N (%)
17. I use disposable hats and surgical shoe when there is the possibility of contact with blood splash, body fluid, secretion or excretion	11 (27.5)	14 (35.0)	8 (20.0)	4 (10.0)	3 (7.5)
18. I do not perform active encapsulation of used needles or perform passive encapsulation of needles with only one hand	19 (47.5)	9 (22.5)	2 (5.0)	6 (15.0)	4 (10.0)
19. Discard needles, blades and other sharps materials in specific waste containers	40 (100.0)	0.0	0.0	0.0	0.0
20. After work accidents with potentially contaminated sharpening materials, immediately squeeze the site, then perform the antisepsis and put on a dressing†	22 (56.4)	4 (10.3)	1 (2.6)	2 (5.1)	10 (25.6)

\*Questions of the questionnaire of adherence to standard precautions <sup>8</sup>;†One individual did not answer this question.

## DISCUSSION

The results confirmed the predominance of women in the profession and of age up to 30 years, coinciding with the profile of Brazilian nurses<sup>11</sup> and with the findings of other studies.<sup>8–9,11–12</sup> The fact that professionals are mostly aged under 30 years may be in favor of greater adherence to standard precautions, since a previous study indicates that professionals over the age of 30 years (and probably more time trained) seem to be influenced by the false notion that their experience and dexterity may replace the protection measures indicated for performing the procedures, becoming more exposed to occupational accidents.<sup>13</sup>

Regarding the working time in the institution/unit, it is worth noting that in 2013, the management of the institution began to be managed by the Brazilian Company of Hospital Services (*Empresa Brasileira de Serviços Hospitalares* - EBSEH) and this change included the renewal of the professional staff of the two units that provide care to critical patients. Thus, at the time of data collection, most professionals had a maximum of three years of work in the units studied, although many had already had more experience in the care of critical patients in other institutions.

The average scores obtained in the questionnaires on knowledge (SPKQ) and adherence (SPAQ) of nurses at standard precautions indicate acceptable levels (17.7 out of 20 and 72.3 out of 80 possible points, respectively), but not those desired, considering that all are professionals with a higher level and that this knowledge is basic to the practice of the profession in any type of service. In addition, as a team leader, the nurse must act properly and in a way that the other members can mirror their conduct when handling the necessary measures for the safety of patients and workers.<sup>14</sup>

It was also observed that 75.0% of the nurses work in shifts of 12 consecutive hours, characterizing an extensive and tiring day, mainly for dealing with patients who require intensive, uninterrupted and complex care. This fact becomes more significant when one considers that the work overload is a facilitating condition for errors and accidents related to the profession.<sup>11,15–16</sup>

It is important to highlight that the adequacy of the workload of these professionals has been studied in order to guarantee patient and worker safety, as well as the quality of life improvement of the latter.<sup>17</sup>

On the other hand, although the majority of the participants reported having only one job, about one third of the nurses had two or more, which can aggravate their fatigue and stress condition and predispose them even more to difficulties in adhering to standard precautions, leading to work accidents.<sup>17</sup> In this sense, the results of this study revealed that nurses with only one job reached an average score in the SPKQ greater than those who work in more than one institution, which may be related to a better adaptation to the workplace, as well as their routines, as found in another study.<sup>18</sup>

This gap between knowledge and adherence is a challenge for nurses, since, in practice, many professionals still present attitudes incompatible with the theoretical knowledge demonstrated.<sup>19</sup> However, if there is no relation between demonstrated knowledge and attitude in practice, one can not expect adequate attitudes without a proper knowledge/recognition of the risks they are exposed and the correct use of different PPEs, reinforcing the need for and recommendation of continuing education and training for all health professionals as a key strategy to minimize occupational hazards and ensure patient safety.<sup>4</sup>

In relation to knowledge about standard precautions, attention is drawn to the fact that 67.5% of nurses consider the statement that the main objective of standard precautions is to protect the health care team, totally ignoring patient protection.<sup>4,8</sup> It is worth remembering that misunderstanding or lack of knowledge about SP can result in serious harm to both the patient and the worker himself, especially when it is observed that not all nurses were sufficiently informed and convinced about the need to apply the standard precautions for the care of all patients. Therefore, regardless of the suspicion or confirmation of infection, of cleaning the hands between the care of different patients, the use of gloves does not exempt the hygiene of the hands after the care and one should avoid contact between contaminated PPE and other materials, equipment, clothes and objects.

Likewise, it is a serious risk to the health of the worker the fact that nurses do not know if it is necessary, or affirm that it is false the indication to always wear gloves for blood collection, venous punctures and whenever there is possibility of hand contact with secretion or excretion of patients, besides also increasing the exposure of patients. Several professionals demonstrated erroneous or misleading knowledge about the manipulation of sharp objects, including the conduct of folding, twisting or realizing the active encapsulation of needles, which can be a determining factor for the high percentage of accidents with this type of material among Health area workers.<sup>15</sup>

In critical care units, in addition to work overload, the need to act quickly in many situations can also negatively interfere with adherence to standard precautions.<sup>11</sup> In emergency care, the professional usually opts for immediate care of the patient, relegating his personal protection into second place and being even more exposed to occupational accidents.<sup>14</sup> Thus, in addition to ensuring an adequate number of nurses so that their tasks can be carried out without haste and constantly reinforcing the importance of standard precautions measures, it is recommended to make available the recommended PPE in strategic and easily accessible locations to improve adherence to its use.<sup>20</sup>

Another point to be emphasized in the professionals' knowledge (SPKQ) is the hygiene of the hands. Although thoroughly studied and disseminated, there are still nurses who reported not knowing if it is necessary or unnecessary to hygienize the hands in situations such as: between the care of different patients, after removing gloves and performing procedures involving risk of contact with blood, secretion or excretion of patients.

Regarding adherence to HH, the SPAQ results also showed that not all nurses "always" clean their hands in the interval between providing care to different patients and after removing the gloves. This reinforces the need to remain up-to-date of occupational risk knowledge, patient safety and

accident prevention, with the expectation that the scientific evidence will contribute to the reorientation of the inadequate conduct of the professionals and consequent improvement of the quality of care offered and working conditions.

Likewise, many participants expressed doubts and lack of knowledge about the type of precautions indicated for different situations. Six nurses considered false the statement that it was necessary to adopt only the standard precautions to assist patients with hepatitis C or syphilis and five that it is indicated to adopt measures of standard precautions and precaution of contact in the care of patients with intestinal and skin infections, while 13 considered true the statement that it is necessary to adopt measures of standard precautions and precaution of droplets, and not of precaution by aerosols to give assistance to people with active tuberculosis or chickenpox. Such misconceptions denote the precariousness of the necessary knowledge and consequently increase the likelihood of exposure to occupational risks and cross-transmission of infections.

Also with regard to the SPAQ, it is observed that there are still many nurses who have not yet fully adhered to the use of all standard precautions indicated in the different situations. This may directly reflect the cross-hospital index of infection observed in the unit, in addition to representing a greater risk of exposure to the professional.

Among the possible explanations for this lack of adherence may be the knowledge gaps identified in the SPKQ, as in the times in which it is necessary to perform the HH, which is still not always performed in the interval between the care of different patients by 20.0% of the professionals investigated and after removing the gloves by 10.0% of them.

Regarding PPE, the use of gloves, in the various situations studied, reached the highest percentage of use among the professionals investigated (ranging from 87.5% to 97.5%), except for intramuscular and subcutaneous injections, in which only 67.5% of nurses reported always using this type of equipment. Results from other studies were similar, indicating that adherence to the use of gloves for administration of intramuscular or subcutaneous drugs was the lowest.<sup>21-22</sup>

The World Health Organization (WHO) recommends the use of gloves whenever there is a potential risk of exposure to blood and other body fluids,<sup>23</sup> mucous membranes and non-intact skin, venous puncture due to the possibility of blood exposure at the puncture site whenever the health care provider's skin is not intact and whenever the patient's skin is not intact.<sup>24</sup>

Following this line of reasoning, the Regional Nursing Council - São Paulo Section<sup>25</sup> issued an opinion confirming the non-compulsory use of gloves for the application of vaccines, leaving the professional to assess the risk of exposure and the type of gloves indicated for each situation. Therefore, the use of gloves to administer intramuscular or subcutaneous injections should result from the professional's analysis of the situation and the possible risk of contact with the patient's blood or other body fluids, and his decision must consider that the glove is an equipment that may protect him in the event of sudden or unexpected exposure.

It is interesting to note that inadequate behavior does not always refer to the lack of knowledge about the dangers and forms of transmission of microorganisms.<sup>26</sup> This statement may be related to the low adherence to the use of disposable hats and surgical shoe in the present study. One possibility is that these products were not necessarily available in the CCU routine, for example, and therefore were not used. In this sense, there has already been evidence that the non-use of surgical shoe by the health team and visitors does not influence the occurrence of infection in an intensive care unit.<sup>27</sup>

Regarding the other types of precautions, it was noted that there are doubts, either in relation to the disease and the type of precaution to be adopted, or in the use of PPE more appropriate to each situation.

It was evidenced that 47.5% answered that they did not recap needles or only performed the passive encapsulation, and 22.5% did it frequently. Although there are strong recommendations

for not recapping needles and emphasizing that this is a great risk factor for the occurrence of work accidents, the literature shows that it is still considered common in health practices, represented by a large number of professionals who still carry out such practice.<sup>11</sup>

Linked to this, it can be said that sharps are the materials that cause most accidents at work, which is a major concern among professionals, since the needles come into contact with potentially contaminated material and can become a source of transmission of infections to the health professional.<sup>15,28</sup>

Studies indicate different variables that are essential to prevent occupational accidents in the units, such as continuing education and professional training, appropriate supervision, availability of adequate materials and PPE in an easily accessible location, and development of an organizational safety culture for patients and workers.<sup>14,20,29-30</sup>

Based on the above considerations, the results showed unsatisfactory adherence to the use of certain types of PPE. In this sense, it turns to the active participation and direct responsibility of the nurse for the prevention and control of HI and occupational accidents, as well as to make the whole nursing team aware so that these high rates of incidence of contamination from work-related accidents are reduced. It is also worth noting the importance of continuing education in service and the direct supervision by the nurse on the care actions carried out, as a fundamental condition for guaranteeing the quality and safety of care.

The study presented limitations, the sample represented two sectors of a specific institution, which, although representative, may be different from other hospital contexts.

## CONCLUSION

It was identified deficit of knowledge and adherence of nurses in relation to the use of standard precautions.

In general, knowledge did not necessarily mean adherence to the correct standard precautions, in what was observed in some answers, but we can also emphasize the non-availability of PPE to these professionals.

When discussing the theme of HI, it is important to remember that its prevention and control must be a constant among all members of the health team, being the adherence to these measures a goal to be placed and a challenge to be achieved, motivating professionals in this growing process.

In addition to the motivation question, it is suggested the adherence to other means with the same objective: training, elaboration of protocols and programs aimed at infection control, continuous education in service, greater involvement of supervisors, in order to have a closer look close to the reality of each unit, which may favor a better adherence to good practices, aiming at safe measures in patient care.

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## NOTES

### CONTRIBUTION OF AUTHORITY

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### ETHICS COMMITTEE IN RESEARCH

The research project was approved by the Research Ethics Committee of the *Faculdade de Ciências da Saúde* of the *Universidade de Brasília*, opinion 1,511,597 and Certificate of Presentation for Ethical Appreciation (CAAE) 55045216.1.0000.0030.

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