

Original Article

Adherence to standard precautions by nursing professionals in a public university hospital: a cross-sectional study

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Abstract

Introduction: The aim of this study was to analyze the adherence to standard precautions by nursing professionals in a public university hospital, and to identify associated factors.

Methodology: This was a cross-sectional study with the nursing staff of a public university hospital. The participants provided sociodemographic and immunization data, training data on standard precautions and occupational accident history, and responded to the questionnaire on adherence to standard precautions (QASP). Descriptive data analysis and Pearson's Chi-square test (χ^2) were performed, followed by Fisher's exact test to verify the association between the adherence to standard precautions (total score ≥ 76 points) and the sample characterization variables. Additionally, binary logistic regression indicated the odds ratio (OR) of the sample characterization variables for adherence to standard precautions. A p value ≤ 0.05 was considered statistically significant.

Results: The average score for adherence to standard precautions, through QASP, by nursing professionals evaluated was 70.5 points. Association between the adherence to standard precautions and the professionals' sample characterization variables was not identified. However, it was observed that experienced professionals (≥ 15 years of experience in the institution) were more likely to adhere to standard precautions (OR 0.062; IC95% [0.006-0.663]; $p = 0.021$).

Conclusions: In general, the adherence to standard precautions by nursing professionals working in health service in this study can be considered inadequate, highlighting major weaknesses in hand hygiene practices, use of personal protective equipment (PPE), recapping of used needles, and conduct after suffering occupational accidents. Experienced professionals were more likely to adhere to standard precautions.

Key words: nursing; occupational risks; biosafety; universal precautions.

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Introduction

Health care-associated infections (HAI) significantly compromise the quality of care in health services, configuring a general public health problem because they raise morbimortality rates in patients, increase the length of hospital stay, and cause financial burden for the health systems. In the case of health professionals, HAI are characterized as occupational infections acquired during job performance [1] that negatively affect the physical and mental health of the healthcare professionals and impact the quality of healthcare [2].

Corroborating this scenario, the work overload stands out as one of the main factors responsible for

increasing the incidence of HAI among nursing professionals [3], which reflects on expressive occupational infection rates among nurses [4-5]. However, globally, there are broad biosafety regulations which play a fundamental role in HAI prevention and control, especially, through adherence to standard precautions while taking care of patients, regardless of suspicion or confirmation of the presence of infection [6].

In this context, it is essential to continually investigate the adherence to standard precautions by nursing professionals, in order to identify potential weaknesses individually and/or institutionally and thus implement measures that can prevent the

mentioned exposures. Thus, the present investigation aimed to analyze the adherence to standard precautions by nursing professionals in a public university hospital, and to identify associated factors.

Methodology

Study design, period and place

This is an observational cross-sectional study, guided by strengthening the reporting of observational studies in epidemiology (STROBE) tool.

Data collection was conducted during the month of June 2019, in a public university hospital located in Campo Grande, Mato Grosso do Sul, Brazil.

Population and eligibility criteria

The population was composed of nursing professionals (nurses, nursing technicians and assistants) working in hospital inpatient units of medical clinic (MC) and surgical clinic (SC), adult intensive care unit (ICU), and infectious and parasitic diseases unit (IPD), at the university hospital of this study.

All the nursing professionals working in the investigated hospital inpatient units who had performed their functions in the institution for at least six months were included in the study. On the other hand, professionals who were on vacation or away from work by any nature during data collection period were excluded from the study. Additionally, professionals who did not fill out the questionnaire were considered ineligible and excluded from the final study sample.

Study protocol

Initially, study participants filled out a questionnaire developed by the researchers in order to collect information about the sample characterization variables which included:

- Sociodemographic data (gender, age, education level, professional qualification, department and length of professional experience at the institution);
- Status of vaccination schedule against Hepatitis B and respective serology;
- Previous participation and interest in receiving training/updates on standard precautions;
- History and incidence of occupational accidents with biological material, as well as notification and justification, if not.

Next, the questionnaire on adherence to standard precautions (QASP), a data collection tool, was applied to all nursing professionals. It is worth noting that, initially, QASP was developed and validated in China

[7], and later, culturally adapted to Brazilian Portuguese [8], with validity and reliability nationally approved [9].

This instrument consisted of 20 questions that are scored on a Likert-type scale. In questions 1 to 19, the scoring is performed as follows: always (4 points), frequently (3 points), sometimes (2 points), rarely (1 point), and never (0 points). For the question 20, scoring is performed in the opposite way, that is, always (0 points), frequently (1 point), sometimes (2 points), rarely (3 points), and never (4 points). Thus, the total score was 80 points and a score that was closer to the maximum score indicated greater adherence to standard precautions by the respondent.

Statistical analysis

Data were tabulated, codified, and validated by double entry, in Microsoft Excel® software spreadsheets, version 2016 and, then exported to IBM SPSS (version 20.0).

Statistical analysis included descriptive analysis (in relative and absolute frequency) of sample characterization variables and answers to each of QASP questions. Pearson's Chi-square test (χ^2), followed by Fisher's exact test were used to verify the association between the adherence to standard precautions (total score ≥ 76 points by QASP) and the sample characterization variables. Binary logistic regression was used to verify the odds ratio (OR) for the dichotomized covariates, such as: gender (female; male), age (27 to 40 years; 41 to 63 years), education level (completed high school; completed higher education, academic minor or master's degree), professional qualification (nursing assistants and technicians; nurse), and length of professional experience at the institution (≤ 14 years; ≥ 15 years) to explain the dependent variable (adherence or not to standard precautions). The statistical significance adopted was $p \leq 0.05$.

Ethical aspects

This study was conducted in accordance with the Helsinki Declaration and was approved by the Research Ethics Committee of the Federal University of Mato Grosso do Sul. Participation in this research was voluntary and anonymous, and all the participants signed an informed consent form, in accordance with Resolution 466/2012 of the Brazilian National Health Council.

Results

At the time of data collection, there was a total of 149 professionals in the nursing staff of the health care

service in which the present investigation was performed. However, 20 of these professionals were initially excluded, because they were on vacation or absent from work due to reason of any nature during that period. Out of the remaining 129 eligible professionals, 120 agreed to participate in the study, however in view of dynamics of health care work, only 94 were able to return the completed questionnaire, and 13 of these were incomplete and consequently had to be excluded, resulting in a final sample of 81 professionals. The sociodemographic characterization of the study participants is presented in Table 1.

All the nursing professionals evaluated claimed to have complete vaccination schedule against hepatitis B; however, only 55.6% (n = 45) reported having positive serology against hepatitis B. Among the other professionals, 30.8% (n = 25) reported having negative serology, and 13.6% (n = 11) did not know the result.

Regarding training on standard precautions, 75.3% (n = 61) and 81.5% (n = 66) of the professionals claim to have previously participated in training and were interested in receiving training/updates on the subject, respectively.

Regarding the occupational accidents, 51.8% (n = 42) of the professionals had already suffered at least one mishap; 83.3% (n = 35) suffered occupational accidents with potentially contaminated sharps, and 66.6% (n = 28) suffered occupational accidents due to contact of unhealthy skin or mucosa with potentially contaminated blood or body fluids. The absolute frequencies of occupational accidents suffered by nursing professionals is presented in Table 2.

Among 90.5% (n = 38) of professionals that suffered occupational accidents with biological material and responded to the question about the notification, only 68.4% (n = 26) reported having always notified what happened. As for the other 31.6% (n = 12), 41.7% (n = 5) reported that they did not notice the occupational accident at that time, 33.3% (n = 4) reported that they did not notify due to bureaucratic issues and a great deal of time to be spent, and 25.0% (n = 3) did not notify for other reasons.

With respect to the adherence to standard precautions, the average score obtained by nursing

Table 1. Sociodemographic characteristics of nursing professionals (n = 81). Public university hospital, Campo Grande, Mato Grosso do Sul, Brazil, 2019.

Sociodemographic characteristics	Nursing professionals N (%)
Gender	
Female	45 (55.6)
Male	36 (44.4)
Age	
27 to 32 years	15 (18.5)
33 to 40 years	30 (37.0)
41 to 50 years	28 (34.6)
51 to 63 years	8 (9.9)
Education level	
Completed high school	21 (25.9)
Completed higher education	28 (34.6)
Academic minor or master's degree	32 (39.5)
Professional qualification	
Nursing assistants and technicians	56 (69.1)
Nurse	25 (30.9)
Working department at the institution	
Medical clinic unit	31 (38.3)
Surgical clinic unit	30 (37.0)
Adult intensive care unit	11 (13.6)
Infectious and parasitic diseases unit	9 (11.1)
Length of professional experience at the institution	
6 months to 5 years	14 (17.3)
6 to 14 years	37 (45.7)
15 to 24 years	22 (27.1)
25 to 45 years	8 (9.9)

professionals, through QASP, was 70.5 (± 4.4) points, and 55 and 79 were the minimum and maximum scores obtained, with a median of 71 points. Table 3 summarizes the absolute and relative frequencies of nursing professionals' responses to each QASP question. Pearson's Chi square test (χ^2), followed by Fisher's exact test did not indicate statistically significant association between the adherence to standard precautions (total score ≥ 76 points by QASP) and the nursing professionals' sample characterization variables. Regarding the binary logistic regression analysis, only the variable "length of professional experience at the institution" had statistical significance. A total of 48 (94.1%) professionals who worked between 1 and 14 years at the institution showed non-adherence, and three (5.9%) showed

Table 2. Absolute frequency of occupational accidents suffered by nursing professionals (n = 42). Public university hospital, Campo Grande, Mato Grosso do Sul, Brazil, 2019.

Nursing professionals who have suffered occupational accidents	Frequency				
	One time	Two times	Three times	More than three times	Ignored*
With potentially contaminated sharps (n = 35)	13	15	5	1	1
By contact of unhealth skin or mucosa with potentially contaminated blood or body fluids (n = 28)	12	8	2	4	2

*Did not respond the question about frequency.

adherence. Among the most experienced professionals (≥ 15 years of experience in the institution), 24 (80%) showed non-adherence, and 6 (20%) showed adherence. Professionals with longer experience were more likely to adhere to standard precautions (Wald = 5.288; OR = 0.062; 5% CI = [0.006-0.663]; p = 0.021).

Discussion

In this study, the professionals who make up the nursing staff in the health care facility obtained average score of 70.5 points (out of a maximum of 80 points) in QASP. At the time of writing this article, there was no specific cutoff parameter for the rates obtained through this instrument. Nevertheless, the values obtained can be considered inadequate, assuming that standard precautions should always be implemented during the health care process for all patients, regardless of evidence of transmissible infection [6].

Among standard precautionary measures, hand hygiene should be treated as an essential measure by all health professionals. Hand hygiene is considered quick, inexpensive and, above all, effective in reducing microbial transmission, and infection prevention and control [10]. Nonetheless, it was observed that measures such as always performing hand hygiene “in the interval between care for different patients”, “after removing gloves” and “after contact with potentially contaminated biological materials” were taken by only 74.1%, 79.0%, and 93.8% of the professionals evaluated, respectively. In accordance with these findings, other studies also report that the practice of hand hygiene is still not absolutely performed among students and nursing professionals [11,12].

For this reason, the importance of causal diagnoses must be considered in order to identify the main factors that can cause poor adherence to hand hygiene by health professionals, such as the dynamic routine of care

Table 3. Absolute (f) and relative (%) frequencies of values obtained by questionnaire on adherence to standard precautions (QASP) by nursing professionals (n = 81). Public university hospital, Campo Grande, Mato Grosso do Sul, Brazil, 2019.

Variables	Always		Frequently		Sometimes		Rarely		Never	
	f	(%)	f	(%)	f	(%)	f	(%)	f	(%)
1. To perform hand hygiene in the interval between care for different patients.	60	74.1	20	24.7	1	1.2	-	-	-	-
2. To perform hand hygiene after removing gloves.	64	79.0	14	17.3	3	3.7	-	-	-	-
3. To perform hand wash immediately after contact with potentially contaminated biological materials.	76	93.8	5	6.2	-	-	-	-	-	-
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.	72	88.9	8	9.9	-	-	-	-	1	1.2
5. Procedures involving the possibility of contact with urine or feces.	81	100	-	-	-	-	-	-	-	-
6. Procedures involving the possibility of contact with patient’s unhealthy skin.	72	88.9	5	6.2	4	4.9	-	-	-	-
7. Procedures involving the possibility of contact with patient’s mucosa.	78	96.3	3	3.7	-	-	-	-	-	-
8. Procedures involving the possibility of contact with patient’s respiratory secretions.	77	95.1	4	4.9	-	-	-	-	-	-
9. Intramuscular or subcutaneous injection.	59	72.9	15	18.5	6	7.4	1	1.2	-	-
10. Dressing wounds.	78	96.3	3	3.7	-	-	-	-	-	-
11. Cleaning for removing blood.	80	98.8	1	1.2	-	-	-	-	-	-
12. Venipuncture.	62	76.5	12	14.8	7	8.7	-	-	-	-
13. Contact with blood samples.	78	96.3	-	-	3	3.7	-	-	-	-
14. To use a protective mask when there is a possibility of contact with blood splash, body fluid, secretion, or excretion.	45	55.6	29	35.8	7	8.6	-	-	-	-
15. To use safety goggles when there is a possibility of contact with blood splash, body fluid, secretion, or excretion.	29	35.8	20	24.7	22	27.2	9	11.1	1	1.2
16. To use a protective apron when there is a possibility of contact with blood splash, body fluid, secretion, or excretion.	44	54.3	27	33.3	10	12.4	-	-	-	-
17. To use disposable caps and shoes when there is a possibility of contact with blood splash, body fluid, secretion, or excretion.	22	27.2	10	12.3	17	21.0	24	29.6	8	9.9
18. To perform no active recapping or one-handed passive recapping of used needles.	28	34.6	15	18.5	17	21.0	12	14.8	9	11.1
19. To discard needles, blades, and other sharps in specific disposal containers.	81	100	-	-	-	-	-	-	-	-
20. After work accidents with potentially contaminated sharps, to immediately squeeze the area, then to perform antisepsis and to apply a dressing.	29	35.8	7	8.6	13	16.0	7	8.7	25	30.9

activities which demand from the professional increasing practicality and readiness in any healthcare institution. Another aspect refers to the need to implement interventions with multimodal approaches in health care services, aiming to achieve improvements in compliance with this practice, since promising results on this issue have already been reported [13].

Concerning the use of personal protective equipment (PPE), only 72.9%, 76.5%, 88.9%, and 88.9% of the professionals reported always using gloves during the procedures of “intramuscular or subcutaneous injection”, “venipuncture”, “blood collection”, and “procedures involving the possibility of contact with patient’s unhealthy skin”, respectively. These procedures present a high risk of contact with blood and, also, possibly, the transmission of certain pathogens, especially hepatitis B virus (HBV), hepatitis C virus (HCV), and human immunodeficiency virus (HIV), among others transmitted through this route [14]. The relevance of using this PPE can be evidenced in a study, conducted over 10 years, which demonstrated an important reduction in occupational exposures to blood and body fluids, based on, among other measures, the increase in compliance with the use of gloves by health care professionals [15].

Concerning the use of other types of PPE, when there is a possibility of contact with blood splash, body fluid, secretion, or excretion, a worrying level of adherence by the professionals evaluated is noted, since only 27.2%, 35.8%, 54.3%, and 55.6% reported always using “disposable caps and shoes”, “safety goggles”, “protective apron”, and “protective mask”, respectively. Such inconsistency in adherence to the use of PPE, among other factors, enhances the risk of exposure to contamination of the professional and the development of occupational infections, making its use essential during health care, especially during infectious outbreaks, epidemics, and pandemics [16]. Conversely, it is also opportune to point out the inadequate or even absent availability of PPE in certain health care services that have reduced financial and material resources, especially in periods of sanitary crisis.

We also recorded alarming data on exposure to the risk of occupational accidents with sharps by professionals of the present study, since only 34.6% of the nursing staff “perform no active recapping or one-handed passive recapping of used needles”. Data from robust studies developed nationally [17] and internationally [18] revealed how this same inappropriate conduct can be considered, among others, as one of the main factors responsible for causing

needlestick injuries in health professionals. This significant failure to adhere to standard precautions regarding the handling of potentially contaminated sharps reflected in the exposure of more than half of the professionals evaluated (51.8%) to at least one occupational accident suffered throughout the professional career, with 83.3% needlestick injuries.

The conduct taken by professionals after suffering occupational accidents with sharps adds even more concern to this scenario, since only 30.9% of the nursing staff reported never having “immediately squeezed the area, then performed antisepsis and applied a dressing”. It is noteworthy that squeezing the affected site can enlarge the exposed area, that is, the gateway for microorganisms. Furthermore, there is no concrete evidence in the literature that points to a reduction in the risk of transmission, from the use of antiseptics, in this situation [19].

Also, among the professionals who suffered occupational accidents with biological material and responded to the question about notification, only 68.4% reported having always notified the exposure. When accidents are not reported, the injured professionals do not receive proper post-exposure prophylaxis, in addition to clinical management and follow-up, thus increasing the risk of acquiring bloodborne infections [19]. At the same time, there are collective losses because the causal diagnosis is not performed and negative organizational aspects related to work are not corrected [20].

In this sense, it is essential that health professionals follow the complete vaccination schedule, as recommended by the responsible institutional bodies, in order to protect themselves against vaccine-preventable infections. For example, hepatitis B can be easily contracted during occupational accidents with sharps contaminated with hepatitis B virus (HBV) [14], but it can also be easily prevented through vaccination [21]. All the nursing professionals in the present study reported having received the three doses recommended by the Brazilian Society of Immunizations (SBIIm) [21].

However, in the case of antibodies against hepatitis B surface antigen (anti-HBs) serology, 30.8% of the professionals reported negative serology, which indicates “absence of antibodies”. In this context, it is worth mentioning that this question in the questionnaire (autofilled) may have raised doubts among some of the professionals evaluated and, possibly, the alternative “absence of antibodies” may have been confused with absence of the pathology, given that many participants selected this option. In view of the relevance of the theme, it must be known and understood by all

professionals, and be better integrated in the professional training curriculum, as well as in continuing education programs.

These findings highlight the need for a closer look at the basic actions of the nursing staff because, although the standard precautions correspond to a basic premise of this profession, it still requires ongoing investments by means of continuing education, through training, qualifications, and updates, aiming to improve adherence to this practice during care activities, as this can be considered as one of the main strategies to promote the protection of health professionals against biological risk [16] and to prevent and control HAI [22].

Nevertheless, 24.7% of the nursing professionals evaluated claimed never to have participated in any training on standard precautionary measures and 18.5% have no interest in receiving such training/updates on the subject. This is substantially worrisome data, considering the proven improvement benefits of adherence to standard precautions, provided by continuing education [23,24]. In this manner, it is of paramount importance that health professionals are kept up to date on the subject that, although basic, is essential for safe practice. In this context, implementing programs with active teaching methodologies, as well as encouraging participation by the institution management are potential strategies to attract these professionals and break any stigma related to continuing education, thus achieving greater adherence to standard precautions for all recommended items.

It is also extremely important to highlight the lack of identification of the association between the adherence to standard precautions and the nursing professionals' sample characterization variables, which can be explained especially due to none of the participants obtaining the maximum score (80 points) in the assessment instrument, what would represent the ideal adherence to standard precautions. Besides, even considering total score ≥ 76 points by QASP as adherence to standard precautions or adherence as close as possible to the ideal, there was a tiny portion of participants who obtained such a score. Another factor that may have contributed to the non-association is based on the fact that the present study was conducted in a single center and, consequently, it had a relatively small sample size.

It was only by binary logistic regression that the variable "length of professional experience at the institution" presented relationship with adherence to standard precautions, so that experienced professionals (≥ 15 years of experience in the institution) are more likely to adhere to standard precautions which can be

explained by the greater awareness acquired in the extended period of clinical practice.

There are also differences between observational and self-report methods that are used to assess the compliance of the adherence to standard precautions by nursing professionals. In this study, the self-reported assessment method by the professionals may be responsible for overestimating compliance with adherence to standard precautions and, consequently, attesting to a level of adherence higher than that which would be directly observed. Nonetheless, we cannot disregard the significant contribution of self-reported assessment methods to develop situational diagnoses individually and collectively.

In the present single-center investigation, the sample elements work in different inpatient departments and may not represent the reality of adherence to standard precautions by nursing professionals nationally and globally, thus not allowing generalizations. In addition, the data from self-reported responses may have overestimated the rates of adherence to standard precautions by the professionals.

However, the present investigation allowed us to perform an accurate situational diagnosis of the clinical practice, concerning the degree of adherence to standard precautions, generally and individually, providing subsidies for health managers and nurses in the targeted implementation of strategies that aim to improve this adherence and thus promote prevention and control of HAI, above all, occupational infections.

Conclusions

Generally, the adherence to standard precautions by nursing professionals working in the health service in question can be considered inadequate highlighting major weaknesses in hand hygiene practices, use of PPE during care procedures of possible contact with biological material, recapping of used needles, and in the conduct after suffering occupational accidents. Professionals with longer experience in the institution were more likely to adhere to standard precautions.

It is recommended to expand continuing education directed to the nursing staff, especially to professionals with less experience, in order to improve adherence to standard precautions during care activities, in addition to the implementation of surveillance and constant monitoring of occupational accident rates in health institutions.

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