Nursing students' knowledge and compliance with standard precautions

Conhecimento e adesão de estudantes de enfermagem às medidas de precaução-padrão

Conocimientos y adhesión de estudiantes de enfermería a las medidas de precaución estándar

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Abstract

Objective: To describe nursing students' knowledge and compliance with standard precautions.

Methods: This is a descriptive and quantitative study with 161 nursing students. Data were collected between September and October 2020, through an electronic form and processed in the Statistical Package for the Social Sciences program, through descriptive analyses.

Results: The mean scores of knowledge and compliance with standard precautions showed satisfactory levels, i.e., higher than half of the possible score. Students recognized that these measures extend beyond care for patients diagnosed with infection or who are in the incubation period of the infectious process. However, they limit their objective to the health team protection, neglecting patient protection. Hand hygiene, as well as the use of gloves in procedures involving contact with potentially contaminated biological material, was the most adopted measure by students. It was observed that compliance with protective measures is higher in the final periods of graduation.

Conclusion: We identified weaknesses in students' knowledge regarding the basic notions that guide and support the adoption of security measures. It is essential to have a nursing curriculum that, throughout the academic cycles, continuously incorporates the prevention and control of infections related to health care in its scope of discussions. This care will be reflected not only in the quality of the care provided, but also in the maintenance of students' health – future workers in the area.

Resumo

Objetivo: Descrever o conhecimento e a adesão dos estudantes de graduação em enfermagem às medidas de precaução-padrão.

Métodos: Estudo descritivo e quantitativo com 161 acadêmicos de enfermagem. Os dados foram coletados entre setembro e outubro de 2020, mediante formulário eletrônico e processados no programa *Statistical Package for the Social Sciences*, por meio de análises descritivas.

Resultados: Os escores médios de conhecimento e adesão às medidas de precaução-padrão demonstraram níveis satisfatórios, ou seja, superiores à metade do escore possível. Os estudantes reconheceram que essas medidas se estendem além dos cuidados para com pacientes com diagnósticos de infecção ou que se encontram no período de incubação do processo infeccioso. Contudo, limitam seu objetivo à proteção da equipe de saúde, preterindo a proteção do paciente. A higienização das mãos, assim como a utilização de luvas em procedimentos que envolviam contato com material biológico potencialmente contaminado, foram as medidas mais adotadas pelos estudantes. Observou-se que a adesão às medidas protetivas é maior nos períodos finais da graduação.

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Conclusão: Evidenciaram-se fragilidades no conhecimento dos estudantes no que tange às noções básicas que norteiam e embasam a adoção das medidas de segurança; revela-se ser fundamental um currículo de enfermagem que, de forma contínua, ao longo dos ciclos acadêmicos incorpore no seu escopo de discussões a prevenção e o controle das infecções relacionadas à assistência à saúde. Tal cuidado se refletirá não só na qualidade da assistência prestada, como também na manutenção da saúde desse estudante – futuro trabalhador da área.

Resumen

Objetivo: Describir los conocimientos y la adhesión de estudiantes de la carrera de enfermería a las medidas de precaución estándar.

Métodos: Estudio descriptivo y cuantitativo con 161 académicos de enfermería. Los datos fueron recopilados entre septiembre y octubre de 2020, mediante formulario electrónico, y fueron procesados en el programa *Statistical Package for the Social Sciences*, por medio de análisis descriptivos.

Resultados: La puntuación promedio de conocimiento y adhesión a las medidas de precaución estándar demostraron niveles satisfactorios, es decir, superiores a la mitad de la puntuación posible. Los estudiantes admitieron que estas medidas se extienden más allá de los cuidados a pacientes con diagnóstico de infección o que se encuentran en el período de incubación del proceso infeccioso. No obstante, limitan su objetivo a la protección del equipo de salud, descuidando la protección del paciente. La higienización de las manos, así como el uso de guantes en procedimientos que implicaban contacto con material biológico potencialmente contaminado, fueron las medidas más adoptadas por los estudiantes. Se observó que la adhesión a las medidas de protección es mayor en los períodos finales de la carrera.

Conclusión: Se evidenciaron debilidades en los conocimientos de los estudiantes en lo que atañe a las nociones básicas que orientan y respaldan la adopción de las medidas de seguridad. Resulta fundamental un diseño curricular de enfermería que, de forma continua y a lo largo de los ciclos académicos, incorpore en sus temas de discusión la prevención y el control de las infecciones asociadas a la atención de salud. Este cuidado se verá reflejado no solo en la calidad de la atención brindada, sino también en la conservación de la salud de ese estudiante, futuro trabajador del área.

Introduction

Healthcare-associated infections (HAIs) are among the most frequent adverse events in health services, and represent a serious health concern due to the high mortality rates associated with them.[1] Moreover, they are a high financial cost to hospitals, in addition to increasing hospital stay and negative effects on patients' health and quality of life. However, most of HAIs are preventable through simple control and prevention measures.[1,2]

HAI prevention and control measures should be adopted in all scenarios where health care occurs, whether in the hospital environment or in another environment. A study[3] identified that the most effective way to prevent and control HAIs is to comply with standard precautions (SP). SP involve hand hygiene, correct use of Personal Protective Equipment (PPE), respiratory hygiene label, practice of safe injection, including use of protective masks during lumbar puncture procedures and catheter insertion.[4] Therefore, it is a set of actions that should be used when caring for any patients, regardless of whether or not it has an infectious condition.[5]

Institutions from different countries identified education as an important factor for HAI prevention and control. Failures in the approach and practice of SP during academic training may compromise the professionals' compliance with preventive measures in the future, putting at risk not only the quality of their care, but also their own health.[6-8] SP should be applied for both the protection of workers against occupational exposure and patients, avoiding cross-transmission of pathogens.[5]

However, the possible gaps in education are not the only aspect capable of negatively impacting SP compliance. Although knowledge is a prerequisite for compliance behaviors, it is also important to identify and eradicate factors that interfere with professional practice. Such factors can highly determine SP compliance, such as over workload, confidence in their own skills and organizational leadership,[9] in addition to the volume of procedures and the behavior of team co-workers who ignore such measures.[10]

Therefore, it is essential to have a nursing curriculum that, throughout the academic cycles, includes HAI prevention and control in its scope of discussions. In this context, the role of teachers in HAI prevention and control training is important, as they act as positive models in carrying out clinical practices, reviewing the measures and protocols established and seeking to develop in students adequate concepts and practices that ensure quality in their work, based on the examples learned during their university career.

Sensitizing students as early as possible about the risks of HAIs and training SP can increase the knowledge and understanding of these future health professionals about the problem in question, to re-

duce the risk of infection, and ensure better quality of care provided and of patient safety. In the work environment, it is necessary that there are educational and training programs, because they sensitize workers and contribute to compliance with preventive measures in those situations that represent health problems.[11]

In this way, students' knowledge and compliance with SP are vital to reduce morbidity and mortality rates caused by these infections, and ensure patient, health professional and student safety. It is worth mentioning that this knowledge should be strengthened from the beginning of academic life and extend to work, as it will allow to improve their attitudes and practices.[10] Given the above, the present study aimed to describe the knowledge and compliance of undergraduate nursing students to SP.

Methods

This is a descriptive study with a quantitative approach, carried out in a university center in the city of Teresina, Piauí. The undergraduate nursing course at this institution works in series, with a closed curriculum, and a total workload of 4,047.4 hours distributed in 9 academic periods. The workload of practical activities is 1,332.4 hours distributed throughout the course, with 800 hours for the supervised internship concentrated in the last two academic periods with the following characteristic: in the 8th period, students are placed in the hospital environment, and, in the 9th period, they do their internship in the context of Primary Care.

To participate in the research, students must meet the following criteria: be 18 years of age or older and be enrolled from the 4th academic term. The adoption of this period as a cut-off point was because practical activities take place concomitantly in simulated and real environments, presuming the application of knowledge about SP in places of nursing care practice. Students with inactive/locked enrollment or who were away from academic activities for any reason during the data collection period were excluded.

The probabilistic sampling process was adopted, justified by the need for population representation, since, in times of pandemic, individuals are being always invited to participate in research, influencing the decision to agree given the fatigue and wear and tear caused by the excessive number of online forms they are responding to, in addition to remote undergraduate teaching activities. Thus, refusals could be significant to the point of impacting data processing.

At the time of the study, there were 276 students who met the inclusion criteria. The sample of 161 respondents was estimated for a confidence level of 95%, margin of error of 5.5% and maximum variance of the estimation of the research parameter of 0.50. The sample distribution by academic period followed the proportionality of the number of students enrolled, as follows: 4th period - 39/67; 6th period - 37/64; 7th period - 16/27; 8th period - 42/72; and 9th period - 27/46. During the data collection period, there was no class in the 5th period and, in progress, there were two classes in the 8th period, one in each shift (morning/afternoon).

Data collection took place between September and October 2020, through an electronic form structured in four sections and made available via email to students through the undergraduate course coordination. It is noteworthy that the researchers did not have access to the personal information of potential participants, based on the General Data Protection Law. The first section consisted of the presentation of the Informed Consent Form (ICF), and the second grouped three questions to characterize sex, age, and school period. Sections three and four referred, respectively, to the Questionnaire on Knowledge on Standard Precautions (QKSP) and the Questionnaire for Compliance with Standard Precaution (QCSP), both freely accessible, adapted and validated for the Brazilian context.[12-14]

The QKSP assesses the respondent's knowledge about SP and consists of 20 items with three response options: yes/true, no/false and don't know. The overall score of the instrument is obtained by the sum of all items. Each true answer is scored one point; for false answers and do not know, a score of zero is assigned. Thus, the maximum score is 20

points. The higher the score, the greater the participants' knowledge on SP.[12]

From the QCSP, respondent compliance with SP is assessed in 20 situations/procedures involving potentially contaminated materials. The response options are arranged on a five-point Likert-type scale, in which: always equals four points, often equals 3 points, sometimes 2 points, rarely 1 point, and a null score is never assigned. The score is calculated by the sum of the scores obtained in each item and can reach up to 80 points. The higher the score, the higher the SP compliance.[14]

The database was extracted from the electronic application in Microsoft Excel®, later reported to the Statistical Package for the Social Sciences (SPSS®) program for data processing. The analysis took place through descriptive techniques of measures of frequency (absolute and relative) and statistics of position (mean) and variability (standard deviation). The values of knowledge and compliance scores were subjected to normality analysis using the Kolmogorov-Smirnov test and homogeneity of variances using the Levene test. As only the normality assumption was met, the Kruskal-Wallis test was applied to compare the scores between the academic periods and the Nemenyi test, in order to verify between which periods the scores differed. The results are presented in tables.

This study respected the ethical precepts of research with human beings, in line with Resolution REC/CONEP 466 of 2012, being submitted to the Research Ethics Committee, obtaining a favorable opinion for its accomplishment (Opinion 4,213,735/2020) (CAAE (*Certificado de Apresentação para Apreciação Ética* - Certificate of Presentation for Ethical Consideration) 35919020.0.0000.5210).

Results

The study included 161 undergraduate nursing students, predominantly female (n = 146, 90.7%). Of these, 91 (56.5%) were between 18 and 22 years old, 55 (34.2%) between 23 and 27 years old and 15 (9.3%) were 28 years old or older. As noted in

Table 1, most participants attended the 8th semester. The mean scores of nursing students' knowledge and compliance with SP showed satisfactory levels: 15.4 of the total of 20 (QKSP) and 72.4 of 80 possible points (QCSP), respectively. The Kruskal-Wallis test identified the effect of the school year on the SP compliance score [$X^2(4) = 11.912$; $p = 0.018$] and not on the knowledge score [$X^2(4) = 4.879$; $p = 0.300$]. The Nemenyi test showed a significant difference between nursing student compliance with SP only in the 7th and 8th periods ($p = 0.010$).

Table 1. Level of knowledge and compliance with standard precautions, according to the period of undergraduate nursing students

Shift	n(%)	Knowledge score			Compliance score		
		Mean±SD	Minimum	Maximum	Mean±SD	Minimum	Maximum
4º	29(18.0)	14.8±2.4	8.0	19.0	72.4±4.2	61.0	78.0
6º	22(13.7)	15.5±2.1	11.0	18.0	73.5±2.9	68.0	78.0
7º	21(13.0)	14.9±2.3	11.0	19.0	68.5±7.2	49.0	80.0
8º	54(33.6)	15.8±1.8	12.0	19.0	73.3±4.0	60.0	80.0
9º	35(21.7)	15.6±1.9	12.0	19.0	72.6±4.9	54.0	80.0
Overall	161(100)	15.4±2.0	8.0	19.0	72.4±4.8	49.0	80.0

In Table 2, We observed that a considerable part of the students is familiar with SP and recognizes that they extend beyond the care of patients diagnosed with infection, or who are in the incubation period of the infectious process. It was found, however, that most students limit the objective of these measures to the health team protection, neglecting the protection of patients.

Table 3 reveals good compliance of nursing students with hand hygiene, as well as the use of gloves in procedures involving contact with potentially contaminated biological material, compared to other PPE. The disposal of sharps in containers suitable for this purpose was predominant. In cases of accidents with potentially contaminated sharps, 35 (21.7%) reported that they did not immediately compress the site.

Discussion

As a limitation of this study, the use of the instrument in the online format stands out. The way questionnaires are applied can influence the type of

Table 2. Undergraduate nursing students' knowledge on standard precautions

Knowledge questionnaire items on standard precautions	Yes n(%)	No n(%)	Don't know n(%)
Do you know what SP are?	139(86.3)	22(13.7)	-
SP should only be applied in patients diagnosed with infection or patients who are in the incubation period for a given infection	33(20.5)	116(72.0)	12(7.5)
Compliance with SP has as main objective to protect the health team	125(77.6)	25(15.5)	11(6.9)
When coming into contact with blood or any other potentially contaminated materials, hands should be washed immediately.	157(97.5)	4(2.5)	-
Hand hygiene should be performed during care delivery to different patients	158(98.1)	3(1.9)	-
Since the use of gloves can prevent contamination of the hands, it is not necessary to sanitize after removing the gloves	58(36.0)	103(64.0)	-
Contact of objects, materials, equipment, clothing and individuals with contaminated PPE should be avoided	159(98.8)	1(0.6)	1(0.6)
PPE must not be shared	92(57.2)	68(42.2)	1(0.6)
When performing oral care procedures or other procedures that may involve contact with patients' mucous membranes, the use of gloves is not mandatory	82(50.9)	79(49.1)	-
In blood collection or venipuncture procedures, the use of gloves is required	160(99.4)	1(0.6)	-
In procedures where there are possibilities of hand contact with secretion or excretion of patients, the use of gloves is necessary	160(99.4)	1(0.6)	-
Gloves should be changed in the provision of care to different patients	159(98.2)	2(1.2)	-
In procedures where there are possibilities of blood spatter, body fluid, secretion or excretion, a protective mask or face shield should be used	161(100.0)	-	-
In procedures where there are possibilities of blood spatter, body fluid, secretion or excretion, personal protective goggles or face shields should be worn	160(99.4)	1(0.6)	-
In procedures where there are possibilities of blood spatter, body fluid, secretion or excretion, secretion or excretion, the protective apron must be used	156(96.9)	3(1.9)	2(1.2)
In procedures where there are possibilities of blood spatter, body fluid, secretion or excretion, disposable caps and shoe covers should be used	145(90.1)	10(6.2)	6(3.7)
It is forbidden to fold, bend or perform the active needle cover. When necessary, perform the passive escape with only one hand. Containers for disposal should be close to the handling area	138(85.7)	19(11.8)	4(2.5)
When providing nursing care to patients with hepatitis C or syphilis, it is necessary to adopt only SP	62(38.5)	90(55.9)	9(5.6)
When providing nursing care to patients with active tuberculosis or chickenpox, it is necessary to adopt SP, in addition to droplet precautions	144(89.4)	11(6.8)	6(3.7)
When providing nursing care to patients with intestinal infections or skin infections, it is necessary to adopt SP, in addition to contact precautions	140(87.0)	15(9.3)	6(3.7)

Table 3. Undergraduate nursing student compliance with standard precautions

Compliance questionnaire items with standard precautions	Always n(%)	Often n(%)	Sometimes n(%)	Rarely n(%)	Never n(%)
I perform hand hygiene in the interval between the provision of care to different patients	133(82.6)	25(15.5)	3(1.9)	-	-
I perform hand hygiene after removing the gloves	127(78.9)	28(17.4)	6(3.7)	-	-
I wash my hands immediately after contact with potentially contaminated biological materials	157(97.5)	4(2.5)	-	-	-
Frequency of use of gloves in procedures where there is a possibility of contact with potentially contaminated biological materials:					
Blood collection	158(98.2)	1(0.6)	1(0.6)	1(0.6)	-
Procedures involving the possibility of contact with urine or feces	154(95.7)	4(2.5)	2(1.2)	-	1(0.6)
Procedures involving the possibility of contact with patients' non-integral skin	146(90.7)	9(5.6)	6(3.7)	-	-
Procedures involving the possibility of contact with patients' mucosa	156(96.9)	4(2.5)	1(0.6)	-	-
Procedures involving the possibility of contact with patients' airway secretions	156(96.9)	5(3.1)	-	-	-
Intramuscular or subcutaneous injection	111(68.9)	31(19.3)	14(8.7)	5(3.1)	-
Dressing procedures	157(97.6)	2(1.2)	1(0.6)	1(0.6)	-
Cleaning for blood removal	150(93.3)	7(4.3)	2(1.2)	1(0.6)	1(0.6)
Venipuncture	145(90.1)	10(6.1)	3(1.9)	3(1.9)	-
Contact with blood samples	143(88.8)	14(8.7)	3(1.9)	1(0.6)	-
I wear a protective mask when there is a possibility of contact with blood spatter, body fluid, secretion or excretion	152(94.5)	7(4.3)	2(1.2)	-	-
I wear goggles when there is a possibility of contact with blood spatter, body fluid, secretion or excretion	107(66.5)	19(11.7)	18(11.2)	9(5.6)	8(5.0)
I wear apron when there is a possibility of contact with blood spatter, body fluid, secretion or excretion	118(73.4)	20(12.4)	15(9.3)	7(4.3)	1(0.6)
I use disposable caps and shoe covers when there is a possibility of contact with blood spatter, body fluid, secretion or excretion	115(71.5)	26(16.1)	11(6.9)	7(4.3)	2(1.2)
I do not perform active cover of used needles or perform passive needle cover with one hand only	76(47.2)	24(14.9)	14(8.7)	9(5.6)	38(23.6)
I dispose of needles, blades and other sharps in designated disposal containers	155(96.3)	4(2.5)	2(1.2)	-	-
After work accidents with potentially contaminated sharps, I immediately compress the site, then perform antisepsis and dressing	87(54.0)	19(11.8)	12(7.5)	8(5.0)	35(21.7)

response of participants.[15] Therefore, the adoption of validated instruments in the version manually filled in paper for the online format should be done with caution, and it is recommended to assess the psychometric properties of the instrument when applying it. However, it is reiterated that the adoption of this technique occurred due to the need for social distance due to the COVID-19 pandemic.

Nevertheless, the answers obtained in this study refer to the need and importance that the funda-

mental notions that support the exercise of the profession need to be reinforced during students' academic trajectory, improving their knowledge, and aiming at their constant updating. This care will be reflected not only in the quality of the care provided, but also in the maintenance of students' health – future workers in the area. This is one of the ways to create a culture of safety at work, so that future workers act to transform this reality in the various work contexts and promoting health and safety conditions at work.

The mean scores of knowledge and compliance with SP revealed acceptable values, considering that they are people under training. However, only student compliance was related to the academic period, with higher scores among students of the 8th academic period. This data may be associated with the curricular structure of the nursing course in question, given that the mandatory curricular internship activities in this period take place entirely in the hospital environment. In this scenario, there are great occupational risks and adverse events related to health care, capable of influencing students' decision by the use of protective measures.

As there are no studies in the literature dealing with this topic with students as their target audience, comparisons were made with the group of nursing workers already inserted in work environments. In this context, students presented higher scores when compared to the nurses,[5] with intermediate levels of compliance among the nursing team.[16,17] Although the scores among professionals, investigated in the aforementioned studies, are within an acceptable range, it cannot be said that they are the desired ones, considering that they are all professionals working. In other words, this knowledge is basic for the exercise of the profession in any type of service, within any scenario.

It is believed that, as they are in the training process and are constantly being assessed regarding their behavior in clinical practice environments, these students can adopt SP more assiduously, as a way of guaranteeing good evaluative concepts by their teachers/preceptors. Moreover, it is worth noting that their knowledge may have influenced compliance, since it was high among respondents.

Thus, it is worth emphasizing that nurses must act properly in relation to current protocols and standards recommended by regulatory agencies and competent bodies, because, in doing so, they strengthen their educational commitment to their work team and young students and apprentices, who see in the attitudes and practices of this professional an example to be followed.

It is important to mention that nurses, when receiving students in their work sector, play a fundamental role, due to the influence they exert on students in their training process, since their practices in the work environment serve as a model for students. In this way, low compliance – or non-compliance of professionals – can change students' behaviors, thus serving as negative standards in their training.[18]

Regarding knowledge on SP, a considerable part of the students showed that they know what such measures refer to and, also, that they extrapolate care for patients with diagnoses of infection or those in the incubation period. Knowledge deficits on SP contribute to serious contamination risks among workers and patients, but also to examples of positive behavior for academics.[19]

Regarding the care of patients with syphilis or hepatitis C, students made it clear that only SP are not enough. Regarding assistance to people with tuberculosis or chickenpox, the answer that precautions should be taken for droplets when, according to the rules, caution is recommended for aerosols. In this regard, when comparing the responses of nurses in relation to the care of people with tuberculosis, it was found that they also answered incorrectly, which denotes deficient knowledge on the subject in particular.[13] Research highlights, however, that, despite having knowledge about the diseases that can be acquired after an accident with exposure to biological material, compliance with prevention measures among students was low.[20]

Regarding the compliance of hand hygiene practice, this study showed that most students always sanitized them after contact with blood or potentially contaminated materials and for care of different patients. However, they did not recognize the need to wash their hands after removing the gloves.

This result differs from studies[17,21] with nursing professionals, in which there was low compliance in relation to hand hygiene after contact with blood or potentially contaminated materials and for the care of different patients.

We identified the response of a student who mentioned never wearing gloves in procedures involving the possibility of contact with urine or feces and cleaning for blood removal. Here, it is worth reflecting on whether students may have marked this option in the wrong way, influenced by acquiescence bias. Acquiescence bias is common in self-administered surveys; it occurs when the person, without considering the content of the utterance, agrees with the item, especially endorsing the extreme points of the scale.[22] This interpretation occurred due to the evident potential for contamination to which the item refers, and it is unlikely that a student would have made such a choice intentionally.

In this context, it is noteworthy that low compliance with hand hygiene practice is incompatible with patient and professional safety, because, according to the World Health Organization, it is a simple and very important practice as a biosecurity measure and in the prevention and control of microorganism transmission.[23]

Regarding the use of PPE, it was possible to verify in this research that most nursing students recognized the need to wear gloves, goggles, mask or face shield, apron, caps, and shoe covers in the procedures. Students, when claiming to use PPE, showed concern about acquiring a disease transmitted in the environment of academic practice, as well as preventing situations in which there may be cross-infection between patients.

In turn, study[24] presents similarities regarding the use of PPE in laboratory practices reported by students, with gloves, lab coat and mask being the most used. Regarding the use of goggles and cap, the result was contradictory, as they consisted of the least used PPE, representing only 4% and 1%, respectively. Data that are not very similar were also found in other studies regarding the use of goggles. One of them revealed that students reported never having used them.[25] Another, resistance to the use of goggles was identified, indicating lower compliance among all surgical clothing items.[26]

Regarding the use of gloves, it was verified in this research that, in relation to frequency, most students reported using this PPE during the development of routine procedures. This finding leads us to think, at first, that students are putting into practice the technical-scientific bases that support the work of nurses and taught in the undergraduate course. On the other hand, when analyzing the data from Table 1, it appears that the knowledge scores do not reveal major changes as students advance in their academic journey. This does not happen in relation to SP compliance scores within the same context.

This fact allows us to infer that students are using PPE and performing SP not because they apply their learning in the internship field, perhaps they are complying with the protocols mechanically, without reflecting on why the practice of certain norms, considering the nature of their inherently repetitive activity.

The procedure glove stands out when compared to other PPE, such as the use of a mask and goggles. The glove is cited as the main PPE – and sometimes the only one – and is consequently the most used by professionals to reduce occupational exposure in contact with blood and body fluids.[27]

Although more than half of respondents always wear a mask, goggles, apron, hats and shoe covers, there is a representative number of students who rarely or never adopted these SPs, contrary to the findings of another study,[28] in which there was 100% compliance with the use of this equipment, resulting from educational activities carried out with these professionals. These findings bring to light the discussion about which issues have subsidized the lack of compliance with these PPE. It is worth noting the possibility of not making such materials available in sufficient quantity because they have a higher financial cost, or even because of the lack of appreciation of risk of contagion through the contact of potentially contaminated materials with the eyes, for instance.

It is important to note that a significant part of the students stated that they did not recap used needles. Behavior different from that identified

in research[16] with professionals from the nursing team of a teaching hospital, in which the recapping of contaminated needles was performed by a significant part of them. It is noteworthy that needle recapping is one of the main factors associated with percutaneous accidents and the exposure of professionals and students to risk of infection.[16] Thus, we refer to the importance of continuing education as a strategy for changing behaviors and compliance with protective measures.

Regarding the disposal of sharps, most students discarded them in specific containers, corroborating the research findings with nursing students from a public university in midwestern Brazil.[29] They stated that the disposal of sharps is the activity that became evident during training, which contributes to avoid the risk of accidents during practical classes. Therefore, it is important, in the teaching-learning process, to provide opportunities for practical simulations and training when disposal is not carried out correctly, providing learning and discussion of the subject without the real risk of having an accident and becoming infected.

Conclusion

This study made it possible for nursing students to reflect on the importance of putting into practice the knowledge acquired in relation to SP. Nursing students' knowledge and compliance with SP presented satisfactory results, higher than half of the possible score in both questionnaires. The results made it possible to highlight weaknesses in respondents' knowledge regarding the basic notions that guide and support the adoption of SP, such as the recapping of needles, which is proscribed by regulations, in addition to the sharing of PPE among the team workers and the non-recognition of the need to sanitize hands after using gloves.

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Collaborations

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