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Nursing staff knowledge and attitudes about safe device catheters in a Brazilian hospital

Conhecimento e atitudes da equipe de enfermagem sobre cateter com dispositivo seguro em um hospital brasileiro

Conocimientos y actitudes del personal de enfermería sobre catéteres de dispositivos seguros en un hospital brasileño

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Abstract: Objective: describing the knowledge and attitudes of nursing professionals regarding a Safe Device with Engineered Controls. **Methods:** cross-sectional descriptive study, carried out in a Brazilian general hospital, specialized in the treatment of HIV/aids. Nursing professionals were interviewed from May to July 2015. Data was analyzed using descriptive and inferential statistics. **Results:** from the 180 interviewees, 72.2% did not participate in any training that offered knowledge about the use of the catheter with a safety device. Regarding the risk attitudes, reinserting the same peripheral catheter before activating the needle protection, in more than one puncture, in the same patient, was mentioned as a routine practice by 48 (26.7%) participants. **Conclusion:** most nursing professionals did not receive training in the use of the devices but could recognize characteristics and mechanisms of protection against needle punctures and contact with blood.
Descriptors: Nurse Practitioners; Needlestick Injuries; Catheters; Occupational Health

Resumo: Objetivo: descrever o conhecimento e atitudes dos profissionais de enfermagem sobre um Dispositivo Seguro com Controle de Engenharia. **Método:** estudo transversal descritivo, realizado em um hospital público brasileiro, especializado para o tratamento de HIV/aids. Foram entrevistados profissionais de enfermagem no período de maio a julho de 2015. Os dados foram analisados por meio da estatística descritiva e inferencial. **Resultados:** dos 180 entrevistados, 72,2% não participaram de treinamento que propiciava conhecimento para o uso do cateter com dispositivo de segurança. Quanto às atitudes de risco, a reinserção de um mesmo cateter periférico antes de acionar a proteção da agulha, em mais de uma punção, no mesmo paciente foi citada como prática rotineira por 48 (26,7%) participantes. **Conclusão:** a maioria dos profissionais de enfermagem não recebeu

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treinamentos para uso de dispositivos, mas reconheceu características e mecanismos de proteção contra picada de agulha e contato com sangue.
Descritores: Profissionais de enfermagem; Ferimentos penetrantes produzidos por agulha; Cateteres; Saúde do trabalhador

Resumen: **Objetivo:** describir el conocimiento y las actitudes de los profesionales de enfermería sobre un Dispositivo de Seguridad con Controlo de Ingeniería. **Método:** estudio trasversal descriptivo, conducido en un hospital público brasileño, especializado en el tratamiento de HIV/sida. Se entrevistó profesionales de enfermería de mayo a julio de 2015. Se analizó a los datos utilizando estadística descriptiva e inferencial. **Resultados:** 72.2% de los 180 entrevistados no participaron de ningún entrenamiento sobre el uso del catéter con dispositivo de seguridad. Con respecto a las actitudes de riesgo, la reinserción del mismo catéter periférico antes de accionar la protección de la aguja, en más de una punción, en el mismo paciente, fue citada como práctica común por 48 (26.7%) de los participantes. **Conclusión:** la mayoría de los profesionales de enfermería no recibió entrenamiento para utilizar los dispositivos, pero reconoció características y mecanismos de protección contra pinchazos y contacto con la sangre.
Descriptores: Enfermeras Practicantes; Lesiones por Pinchazo de Aguja; Catéteres; Salud Laboral

Introduction

Nursing is the most common professional category in hospital institutions. Nurses carry out several procedures, which put them in close contact with the patient more often than any other professional, and as a result, they are the professionals who, in most cases, carry out peripheral venipunctures (PVP). Consequently, they constantly handle and discard sharp materials, increasing the odds of exposure to biological material and the risk of accidents. Among the risks to which the nursing professional is exposed, biological risk stands out, as the exposure to biological agents such as genetically modified or not microorganisms, cell cultures, parasites, toxins, and prions. To protect these professionals, knowledge and attention in the performance of these procedures is paramount.[1-3]

Due to this routine, the occupational exposure to biological materials during PVPs has been documented in literature, especially with the involvement of nursing professionals.[4] Literature data show that most workplace accidents (77.7%) with nursing professionals involved sharp materials.[5]

Considering the risk factors inherent to the activities carried out by nursing professionals, such as using the peripheral venous catheter, the risk of touching the blood, percutaneous lesions, workloads, experience in the profession, and absence of training with regards to sharp object management[4,6], it becomes important to highlight the use of Safe Devices with Engineered Controls (SDEC).[7-9] That is paramount to avoid not only accidents with sharp materials, but also to avoid direct contact with blood.[7-9]

The SDEC are materials used for PVPs and other procedures including the different features to protect the tip of the needle or the entire needle, or even mechanisms that prevent or minimize the contact with blood before or after the puncture.[10-11] SDECs are classified according to the mechanism used to activate needle protection, which can be passive, meaning the user does not need to activate any resource to protect the needle after its use, or active, meaning the user needs to activate some safety mechanism, such as a button, a lid, or a lock.[10]

Aiming to diminish the number of needle punctures and/or exposure to blood, the use of SDECs became mandatory in some countries.[4,12] In Brazil, in 2008, Decree GM n. 939, from November 18, stated that within six months, training and device information needed to be disseminated; 18 months later, implementation and market adaptation should take place; and up to 24 months from the date of the Decree, employers should replace older sharp materials with those with safety devices.[13] The laws and decrees have been establishing the use of such devices, to diminish accidents involving sharp objects.[1,13]

International studies suggested that, after the SDECs were introduced, together with training programs about them, there was a diminution in the number of percutaneous accidents, associated to capacitation courses or training programs.[9,14-15] In Brazil, an investigation pointed out that the adoption of a single safety device significantly diminished the number of percutaneous accidents in the nursing team.[8]

Since this strategy is innovative and costly for the health system, and directly contributes for accident prevention programs involving nurses, the following research question was established: what is the knowledge of health professionals that work in a hospital specialized in infectious and contagious diseases with regards to a new PVP device? As a result, this investigation aimed at describing the knowledge and attitudes of nursing professionals about SDECs.

Method

This is a cross-sectional and descriptive study, whose data collection was carried out from May to July 2015, in a public Brazilian hospital specializing in HIV/aids treatment, which adopted the SDEC for PVP since late 2008.

During data collection, the institution had a SDEC with a passive safety system. The protection is activated via covering the tip of the needle as soon as the needle is removed from the tube, not requiring any actions from the user.

At first, the population included 210 nursing professionals from three categories: nurses, nursing technicians, and nursing auxiliaries. After applying inclusion (assistance in direct contact with the patient) and exclusion criteria (being on leave during data collection), 184 professionals were left to participate in the research.

To do so, an instrument with open and closed questions was used. It contained variables on: sociodemographic and professional characterization, accidents that took place; and aspects regarding the SDECs that are now used, such as the easy and difficult aspects of their use. This instrument was created by the authors and submitted to the appreciation of three specialists in the field, who evaluated it according to the form and pertinence of the questions with regards to the objective of the research. A pilot study was carried out with 10 nursing professionals from the inpatient unit from the same hospital. Four of these professionals were nurses and six were

nursing technicians. The questionnaire applied to these professionals was not used in the final study. 180 nursing professionals answered the data collection instrument, and there was a sample loss of four professionals, who could not be found in the unit they worked in the days selected for data collection.

Data was collected by the researchers, who, during all work shifts, approached the professionals in the moments they found most adequate. After understanding the objectives of the research and signing the Free and Informed Consent Form (FICF), participants answered the data collection instruments, which were kept in separate envelopes and sealed by the researchers. Later, the envelopes were opened, and data was typed into a database in Microsoft Excel. Descriptive and inferential statistical analyses (Kolmogorov-Smirnov and Chi-Square tests; $p<0.05$) were carried out using the IBM SPSS® software, version 22.

This research was approved by the Hospital Research Ethics Committee, under Protocol n. 956.314 and CAAE registry 35510714.2.3001.5124, in February 10, 2015, and by the Research Ethics Committee of the University, under Protocol 863.814 e CAAE registry 35510714.2.0000.5545, from October 30, 2014. The authors carried out the investigation according to the ethical precepts of the resolutions related to human being researches.

Results

Among the participants, 27 (15.0%) were nurses, 140 (77.7%) were nursing technicians, and 13 (7.2%) nursing auxiliaries; most (53.9%) were male; with a mean age of 40.2 years, standard deviation (SD)=8.33, with less than five-year experience in this job (n=138/76.7%). The mean number of hours worked during the week (including hours worked in other jobs) was 47.8 (SD=17.2).

Regarding the work sector, 62.8% worked in hospitalization units, 30.0% in Intensive Care Units (ICUs), and 1.1% in therapeutic house care.

From the 50 (27.8%) professionals who stated to have trained to use the SDEC, 20.0% stated that the training was offered by the hospital, and 6.7% stated it was offered by the manufacturer of the product; two participants (1.1%) did not answer. An association of whether there was a training session to use the SDEC with the professional category found a statistical difference (p=0.009), according to which the percentage of workers who underwent training sessions was higher among Nurses than in other categories.

Table 1 presents the characterization of professionals according to job category, sex, age, unit, time working in this position, and training for the use of the SDEC.

Table 1 - Characterization of nursing professionals from a public hospital, according to job category, sex, and work unit. Belo Horizonte/MG, 2015.

Variable		N	%
Category	Nurse	27	15.0
	Nursing technician	140	77.7
	Nursing auxiliary	13	7.2
Sex	Female	83	46.1
	Male	97	53.9
Age	< 19	12	6.7
	20 – 29	13	7.2
	30 – 39	72	42.9
	40 - 49	55	30.6
	> 50	28	15.6

Work unit	Hospitalization	113	62.8
	Intensive Care Unit	54	30.0
	Surgical Unit	07	3.9
	Hospital during the day	04	2.2
	Therapeutic House Care	02	1.1
Time working in the institution	< 5	138	76.7
	5 – 10	15	8.3
	> 10	27	15.0
Course/Training session to use the safe device with engineered controls	Yes	50	27.8
	No	130	72.2

Source: Research Data.

Table 2 describes the responses with regards to the knowledge of the nursing professionals about the features of the SDEC used in the hospital in the period of investigation.

77.2% of the participants stated they do not feel protected from needle pricks and from direct contact with blood by using the current SDEC. Most, 81.1%, stated there was a change in the technique for inserting the device when compared to the conventional catheter. The SDEC, according to 60.6% of the professionals, enables covering the tip of the needle — 78.3% of them said that it can be entirely covered after use. Regarding direct contact with blood while using the catheter with the device, 81.1% of professionals stated that the device makes it impossible to get in direct contact with blood during venipuncture. The device, however, does not prevent direct contact with blood after the venipuncture procedure is over, according to 78.3% of

participants.

Table 2 - Answers from participants regarding the features of a SDEC for PVP. Belo Horizonte/MG, 2015.

Variable	Yes		No		No Answer	
	N	%	N	%	N	%
Feels protected from needle punctures and from direct contact with blood by using the current catheter which has a safety device	35	19.4	139	77.2	06	3.3
The insertion technique changed (when compared to the conventional catheter)	146	81.1	24	13.3	10	5.6
It makes it possible to cover the tip of the needle	109	60.6	71	39.4	-	-
It makes it possible to cover the entire needle after use	39	21.7	141	78.3	-	-
It is possible to get in direct contact with blood during puncture	34	18.9	146	81.1	-	-
It is possible to get in direct contact with blood after the puncture	141	78.3	39	21.7	-	-

Source: Research Data.

Table 3 presents what are the easy and difficult aspects of using the SDEC.

Table 3 - Easy and difficult aspects of using a SDEC for PVP as described by nursing professionals. Belo Horizonte/MG,2015.

Variable	Yes		No	
	N	%	N	%
Easy aspects				
Protection from needle punctures	141	78.3	39	21.7
Protection from direct contact with blood	57	31.7	123	68.3
Practical	92	51.1	88	48.9
Easy to use	81	45.0	99	55.0

There are no easy aspects	03	1.7	177	98.3
Difficult aspects				
It only protects the tip of the needle	32	17.8	148	82.2
Lack of training	44	24.4	136	75.6
Lack of skill	12	6.7	168	93.3
Difficult to handle	20	11.1	160	88.9
There are no difficult aspects	84	46.7	96	53.3

Source: Research Data.

Regarding the easy aspects about the introduction of the SDEC, as mentioned by nursing professionals, the most commonly cited was the protection against needle pricks (78.3%). Regarding the difficulties mentioned, most professionals stated not to have any difficulties, whether referring to handling, training, or to the fact that only the tip of the needle is protected.

Concerning their perception of safety, 166 (92.2%) stated that the current catheter with safety device does not perform reliably, since it protects only the tip of the needle and does not prevent direct contact with the blood. Since they work in a hospital that deals with infectious diseases, this type of protection is essential. Nine (5.0%) participates said they trusted the protection offered by the device, and five (2.8%) did not know how to respond. There were no significant differences (p=0.85) when the professional categories and the trust in the device used were compared.

Regarding the same issue, 18 (10.0%) participants stated that they have been part of a situation in which the device was not adequately activated after puncture; 11 (6.7%) did not answer.

Table 4 presents the attitudes of professionals with regards to the use of gloves and the reinsertion of the catheter with SDEC.

Table 4 - Attitudes of nursing professionals regarding the use of gloves and the reinsertion of the catheter with SDEC.

Variable	Yes		No		Sometimes	
	N	%	N	%	N	%

Do you use procedure gloves in all venipunctures with the catheter with SDEC you currently use	167	92.8	04	2.2	09	5.0
Have you ever reused the same peripheral venous catheter with SDEC before activating the protection of the needle in more than one venipuncture (when compared to the conventional catheter)	48	26.7	125	69.4	07	3.9

Concerning attitudes that put the professional and the patient at risk, PVPs with no gloves were mentioned by four (2.2%) participants, who justified their actions by saying the glove is a hindrance to palpate the vein; nine (5;0%) stated to use gloves only in certain situations; 167 (92.8%) stated that they always use gloves.

Reinserting the same peripheral catheter in more than one puncture before activating the protection of the needle, in the same patient, was mentioned as a routine practice by 48 (26.7%) participants; seven (3,9%) said they did this in some occasions; most (69.4%) always used a new catheter for a new puncture. There was no significant difference (p=0.10) when professional categories were associated with the use of gloves, neither when the reuse of catheter with percutaneous accidents notified in the unit for the health and safety of workers (p=0.82). Concerning the reuse of the catheter associated to the professional category, there was a significant difference (p=0.006), The percentage of Reuse = 1 was significantly higher in the group of nursing technicians and auxiliaries(73.2%>48.1%), while the percentage of Reuse = 2 was significantly higher in the group of Nurses (51.9% > 22.2%).

Discussion

In this research, there was a greater participation of nursing auxiliaries and technicians. This can be justified by the fact that the nursing team was made up of 80% auxiliary and nursing technicians, and 20% nurses.[16]

Regarding sex, there were more males, as opposed to other researches found in national and international literature[7,17], and also to a research carried out by the National Nursing Council (COFEN) in partnership with the Oswaldo Cruz Foundation, which, despite showing that there is a trend for the increase in the number of males in the profession, 84.6% of workers in the field are women, still.[18] With regards to age group, most are from 30 to 39 years old, corroborating another study.[19]

Concerning the Course/Training Session to use the SDEC, despite it being mandatory, data from this investigation showed that most workers stated not to have received any, be it offered by the manufacturer or by the hospital itself. The statistical test showed that nurses underwent more training sessions than nursing technicians or auxiliaries.

The lack of motivation, encouragement, and the little investment by the managers, coupled with the fact that management did not see fit to give the workers time off to participate in the trainings, which took place during work hours, are some difficulties that prevent adherence from the nursing professionals to the training.[20] Training to use correctly the SDEC, associated to courses or training programs can contribute to diminish the number of needle accidents, and should be encouraged and periodically carried out.[21]

Nursing professionals should receive permanent education, since technologies related to health undergo constant transformations, and one needs to update one's knowledge to be on par with the advances in the field. [22]

In Brazil, Regulating Norm 32 establishes that the training course for the correct SDEC use should be made available to workers in the health services by the companies that manufacture or market sharp materials.[1,13]

Before the introduction of any SDEC in the field of health, the health and safety of the worker must be evaluated, as well as the satisfaction of the user, and the safety and comfort of the patient. Only then the adequacy of this device in a safe and efficient practice can be guaranteed.[10] The SDEC used for PVP may give specific features according to model or manufacturer. Their needle protection mechanism can be passive or active, or the systems might prevent blood reflux, diminishing the chances of splashes or direct contact with blood after the needle is removed and/or in the entry point of the device.[10-12] Therefore, identifying the features and all necessary requirements for the working of the device may be difficult for the professional, since they directly use many sets of products in hospital assistance.

Concerning the knowledge of nursing professionals with regards to the SDEC, most were capable of answering information with regards to their features, such as the needle-tip protection or contact with blood. Such factors show the importance of the participation of the professionals in the choice of the product they will use, as well as in the involvement of the managers.

This result shows how important the participation of the professionals is in the choice of the product they will use, as well as the involvement of the managers. Authors of researches related to the satisfaction and evaluation of SDECs, stated that the training of professionals is paramount, before, during, and after a new SDEC is implemented, being essential not only to avoid exposure, but also to prevent the institution from suffering unnecessary expenses.[23-25]

In this investigation, gloves were mentioned by most professionals, but since this was a self-reporting instrument, data may be overrated. In this aspect, a study on the cautiousness of nursing professionals during PVP made it clear that, despite most of them answering that they

always used procedure gloves, a certain number of professionals still state they do not use it. Their reasons to do so must be further explored, since this is a risk procedure.[2]

Conclusion

This study found that most nursing professionals knew the features of the SDEC that is currently used in the institution they work, despite reporting not feeling protected by the use of the catheter. Regarding the attitudes in the procedures carried out with the SDEC, most presented safe behavior, which does not exclude the risk of exposure to biological materials and accidents involving sharp objects.

Therefore, this study highlights the need for hospitals and manufacturers to provide training programs before and during the implementation of new devices, such as the SDEC, in addition to measures to prevent exposure to biological materials.

Data were collected in a single moment within one institution, and as a result do not reflect the reality of other settings. New studies with other methodologies that allow for the identification and understanding of nursing professionals concerning PVP and SDEC will be important for nursing practice.

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