REVISTA DA ESCOLA DE ENFERMAGEM DA USP
JOURNAL OF SCHOOL OF NURSING · UNIVERSITY OF SÃO PAULO

ORIGINAL ARTICLE

doi: https://doi.org/10.1590/S1980-220X2019011203629

Central Venous Catheter bundle: professional knowledge and behavior in adult Intensive Care Units*

Bundle de Cateter Venoso Central: conhecimento e comportamento de profissionais em Unidades de Terapia Intensiva adulto

Bundle de Catéter Venoso Central: conocimiento y comportamiento de los profesionales en Unidades de Cuidados Intensivos de adultos

How to cite this article:
Costa CAB, Araújo FL, Costa ACL, Corrêa AR, Kusahara DM, Manzo BF. Central Venous Catheter bundle: professional knowledge and behavior in adult Intensive Care Units. Rev Esc Enferm USP. 2020;54e03629. doi: https://doi.org/10.1590/S1980-220X2019011203629

Camila Adriana Barbosa Costa[1]
Fernanda Lopes Araújo[1]
Anna Caroline Leite Costa[1]
Allana dos Reis Corrêa[1]
Denise Miyuki Kusahara[2]
Bruna Figueiredo Manzo[1]

* Extracted from the dissertation: "*Bundle* de Cateter Venoso Central: conhecimento e comportamento de profissionais de saúde das Unidades de Terapia Intensiva Adulto de um hospital de grande porte", Universidade Federal de Minas Gerais, 2017.

[1] Universidade Federal de Minas Gerais, Belo Horizonte, MG, Brazil.

[2] Universidade Federal de São Paulo, Escola Paulista de Enfermagem, São Paulo, SP, Brazil.

ABSTRACT

Objective: To evaluate knowledge and behavior of professionals in Intensive Care Units regarding the actions recommended in the bundle on preventing central venous catheter-related bloodstream infection. **Method:** Cross-sectional descriptive quantitative study, conducted in three Intensive Care Units. The data were collected through a face-to-face questionnaire applied to health professionals. The software R 3.3.1 was used for data analysis. **Results:** Two-hundred and ninety-two professionals participated. Regarding knowledge, the hand hygiene item presented a higher level both for the insertion (92.46%) and maintenance (97.27%) moments. Usage of chlorhexidine as an antiseptic, followed by alcohol (47.94%) and providing a date for hub or connectors (19.87%) were the least known items. As for behavior, the professionals reported: using always the correct attire for catheter insertion (84.25%), never waiting for the antiseptic to dry before catheter insertion (25.34%) and never cleaning hub or connectors with 70% alcohol (23.86%). **Conclusion:** Results show that the professionals' knowledge and behavior regarding the central venous catheter bundle present deficiencies, revealing the importance of promoting training programs for this knowledge domain.

DESCRIPTORS

Cross Infection; Catheter-Related Infections; Central Venous Catheters; Patient Safety; Intensive Care Units; Critical Care Nursing.

Corresponding author:
Anna Caroline Leite Costa
Avenida Professor Alfredo Balena, 190, Santa Efigênia
CEP 30130-100 Belo Horizonte, MG, Brazil
anna.leitebh@gmail.com

Received: 04/28/2019
Approved: 11/14/2019

INTRODUCTION

Healthcare-associated infections (HAI) are one of the biggest challenges for patient safety and one of the main adverse events affecting healthcare users worldwide. The risk for HAI is remarkably higher in Intensive Care Units (ICU), where approximately 30% of patients are afflicted by at least one infection episode. High infection frequency is associated to the employment of invasive devices. Among them, primary bloodstream infection (PBSI), associated to central venous catheter (CVC) usage, is highlighted[1-2].

In 2014, the National Healthcare Safety Network estimated the "occurrence of 30,000 new cases of this infection each year in United States ICUs"[3]. In Brazil, its rate in adult ICUs in 2016 was 4.6 infections for every 1,000 CVC per day[4].

Due to the relevance of PBSIs associated to CVC usage and their repercussions both for patients and for health units, hospital institutions are known to continuously invest in measures and strategies aimed at these infections' control and prevention, following the literature's recommendations. Among them, those presented in the Guideline for the Prevention of Intravascular Catheter-Related Infections, by the Centers for Disease Control and Prevention (CDC), are particularly remarkable. According to this document, multimodal measures for preventing catheter-related infections must be applied to health assistance through a bundle, or a set of actions to be carried out when inserting or maintaining the CVC[5].

In the CVC insertion bundle, recommended measures include: hand hygiene, use of maximal barrier precaution, skin antisepsis with chlorhexidine gluconate, insertion area selection, femoral vein avoidance, daily review of the need for catheter permanence and its immediate removal when no longer prescribed[6]. After the CVC insertion, the aspects to be considered are: hand hygiene before device manipulation, rubbing connector and catheter connection with 70% alcohol for 30 seconds, precautions regarding bandages and daily verification of the need for catheter permanence[5-7].

To enable health professionals to contribute to preventing and minimizing CVC-related infections and, consequently, to patient safety, it is necessary that the multiprofessional teams working at the ICUs be aware of scientifically-based information and present behavior in accordance with the recommendations laid out in the bundle for catheter-related infections[8].

This study was proposed to evaluate the knowledge and behavior of ICU professionals regarding actions recommended in bundles for the prevention of CVC-related PBSI. It may contribute to evaluating protocol implementations while rethinking training strategies and appropriate work processes, aiming at implementing measures advised for CVC-related PBSI.

METHOD

Study type

Cross-sectional descriptive quantitative study.

Scenario

Research conducted in three ICUs in a large sized public hospital in Belo Horizonte, Minas Gerais state, Brazil.

The study population included assistance team members who were involved in CVC management (physicians, nurses and nursing technicians) in the study units.

Participant inclusion criteria were being assigned the ICU and actively providing assistance during data collection. Professionals on vacation or sick leave were excluded.

Sample

Following these criteria, 345 professionals were invited to participate in the study. Out of these, seven were on sick leave and forty-six refused to participate. The final sample comprised hence 292 subjects (84.6%). Professional categories were compared, since all professionals are responsible for preventing catheter infections, regardless of their category. Their professional education level is varied, what may influence their knowledge and behavior regarding PBSI control. For such comparisons, tests were performed to verify homogeneity among the groups. These tests are described in the data analysis section.

Also, investing on training and professional updates, as well as the professional's participation in indexes analysis and action plan construction, may interfere in adherence to practices aimed at CVC-related infection prevention.

Data collection

For research conduction, the instrument "Self-reported knowledge and behavior on the CVC bundle" was assembled in three phases. On the first phase, to build the instrument, a literature review was carried out in journals indexed in the Latin American and Caribbean Health Sciences Literature (LILACS) and Medical Literature Analysis and Retrieval System Online (MEDLINE) databases, using descriptors "catheter-related infections", "catheterization", "infection control" and "intensive care units". The CVC bundle recommendations described by CDC and fostered by ANVISA (National Sanitary Surveillance Agency) supported the instrument's elaboration[5].

The data collection instrument included the professionals' sociodemographic characteristics (gender, age, work shift, years of education, employment relationship, workload, profession and specialization). Concerning knowledge on the CVC insertion bundle, verified items comprised hand hygiene, usage of maximal barrier precaution, skin asepsis and appropriate catheter insertion site. As for knowledge on CVC maintenance, the items included hand hygiene, hub and connectors disinfection, providing dates for infusion sets and extensions and daily evaluation of the need for CVC permanence. The questions evaluated knowledge through the alternatives "disagree", "completely agree" and "partially agree".

The behavior evaluated included items concerning insertion, such as hand hygiene, usage of maximal barrier precaution and skin asepsis. For behavior during maintenance, the items considered were hand hygiene, hub and connector disinfection, providing dates for infusion sets and extensions and daily CVC

evaluation. The questions presented four alternatives as answers ("always", "nearly always", "sometimes" and "never").

The instrument was submitted to analysis by three patient safety and intensive therapy PhDs for content and presentation appraisal. Experts were defined as nurses with a minimum of two-year experience teaching or providing intensive therapy assistance and/or infection control. A pre-test of the instrument was conducted with this study's professional categories to guarantee its clarity and comprehension, which brought forward the necessity of language adjustments on the item professional behavior evaluation.

Data collection lasted from October 2017 to January 2018 and was conducted through a face-to-face interview. The interviewer read the questions aloud to the participant and registered his/her answer in the questionnaire. Concerning his/her knowledge, the professional was required to answer whether the item read by the interviewer was included or not in the CVC-related PBSI bundles. Regarding their behavior, professionals were instructed to report how often they performed the actions advised by the CVC-related PBSI prevention bundle.

Data treatment and analysis

The collected data were tabulated into an Excel 16.0 spreadsheet and their analysis was conducted in the software R version 3.3.1. For a descriptive analysis of the qualitative variables, absolute and relative frequencies were calculated, whereas measures of central tendency and dispersion were used for the quantitative variables. To verify homogeneity among groups (Physician, Nurse, Nursing Technician), Chi-squared and Fisher exact tests were employed for the qualitative variables. The chi-squared test was adopted when all contingency table cells presented frequencies above five, whereas Fisher exact was used when the cells had frequencies equal or smaller than five. For quantitative variables, the Kruskal-Wallis test was used and, when the test indicated a significant difference, the Nemenyi test was employed for multiple comparison. The results of the final test were considered significant, with a 5% significance level ($p < 0.05$) and a 95% confidence interval.

Ethical aspects

The research participants were informed of the study objectives and signed the Informed Consent Form (ICF), after the approval by the Coparticipant Institution's Research Ethics Committee in Opinion n. 1.288.258/15, in compliance with Resolution n. 466/12 by the National Health Council.

RESULTS

Among the 292 interviewed professionals, most were female (77.74%) and between twenty and sixty-two years old; the median was thirty-two years old. Most participants were nursing technicians (n=179; 61.30%), followed by physicians (n= 60; 20.55%) and nurses (n=53; 18.15%). Among the fifty-three participating nurses, thirty-eight (71.69%) had taken specialization courses. Out of these, twenty-seven (71.05%) were in the Nursing Intensive Care area. From the sixty responding physicians, forty-two (70.05%) reported being Intensive Therapy experts. Among participants, professional education time ranged from twenty-nine days to thirty-six years, with a median of eight years. ICU experience varied between twenty-nine days and thirty years, with a median of three years.

Regarding the interviewees' knowledge on the CVC infection prevention bundle, nursing technicians (n=126; 70.39%) and nurses (n=46; 86.79%) were the professionals who had engaged in training the most. Forty-eight physicians (80%) reported obtaining knowledge on the bundle through books, journals or the internet, whereas in the nurses' group thirty-seven (69.81%) had acquired it through hospital-provided training, which was also the case for nursing technicians (n=152; 84.92%). As for participation in the unit's index analysis and planning interventions related to catheter infection, six (10%) physicians and fifteen (28.3%) nurses reported taking part in them, whereas 100% of the technicians reported not engaging in such activities.

Table 1 presents variables on self-reported professional knowledge and behavior regarding the central venous catheter insertion bundle.

Table 1 – Self-reported knowledge and behavior on the central venous catheter insertion bundle – Belo Horizonte, MG, Brazil, 2018.

Variables		Nursing technician		Nurse		Physician		P-Value
		n	%	N	%	n	%	
Knowledge on the CVC insertion bundle								
Hand hygiene/asepsis before catheter insertion	Completely agree	169	94.41	49	92.45	57	95.00	0.072[1]
	Partially agree	10	5.59	4	7.55	3	5.00	
	Disagree	0	0.00	0	0.00	0	0.00	
Maximal barrier precaution for central venous catheter insertion	Completely agree	123	68.72	38	71.70	33	55.00	**0.019[2]**
	Partially agree	50	27.93	14	26.42	23	38.33	
	Disagree	6	3.35	1	1.88	4	6.67	
Maximal barrier precaution by the responsible for procedure assistance	Completely agree	147	82.12	50	94.34	38	63.33	**0.001[2]**
	Partially agree	21	11.73	3	5.66	12	20.00	
	Disagree	11	6.15	0	0.00	10	16.67	
Usage of antiseptic and alcoholic solution for skin asepsis	Completely agree	89	49.72	26	49.05	25	41.67	**0.043[2]**
	Partially agree	27	15.08	16	30.20	20	33.33	
	Disagree	63	35.20	11	20.75	15	25.00	

continue...

...continuation

Variables		Nursing technician		Nurse		Physician		P-Value
		n	%	N	%	n	%	
Avoiding the femoral vein	Completely agree	93	51.95	37	69.81	43	71.67	**0.006**[2]
	Partially agree	72	40.23	14	26.42	17	28.33	
	Disagree	14	7.82	2	3.77	0	0.00	
Self-reported behavior on the CVC-insertion bundle								
Full attire during catheter insertion	Always	154	86.52	41	77.36	51	85.00	0.524[2]
	Nearly always	20	11.24	11	20.75	8	13.33	
	Sometimes	4	2.25	1	1.89	1	1.67	
	Never	0	0.00	0	0.00	0	0.00	
Hand hygiene/asepsis before catheter insertion	Always	149	83.24	40	75.47	46	76.67	**0.043**[2]
	Nearly always	19	10.61	13	24.53	11	18.33	
	Sometimes	11	6.15	0	0.00	3	5.00	
	Never	0	0.00	0	0.00	0	0.00	
Waiting for the antiseptic to dry before catheter insertion	Always	63	35.80	9	16.98	16	26.67	**0.003**[1]
	Nearly always	42	23.86	21	39.62	23	38.33	
	Sometimes	21	11.93	9	16.98	14	23.33	
	Never	50	28.41	14	26.42	7	11.67	
Breaking sterile technique during catheter insertion	Always	7	3.91	0	0.00	0	0.00	**0.002**[2]
	Nearly always	10	5.59	0	0.00	3	5.00	
	Sometimes	59	32.96	30	56.60	37	61.67	
	Never	103	57.54	23	43.40	20	33.33	

Note: [1] Chi-squared test; [2]Fisher Exact; *Percentage of intervention frequency estimated by the professionals

There was higher disagreement among physicians on maximal barrier precaution usage being a bundle item, either to the professional who performs catheter insertion (p=0.019) or for the one who assists insertion (p=0.001). Regarding skin asepsis, the smallest agreement was observed among nursing technicians (p=0.043). As for self-reported behavior during CVC insertion, there were statistically significant differences among groups for the following items: hand hygiene and/or asepsis before catheter insertion (p=0.043); waiting for the antiseptic to dry before catheter insertion (p=0.03); breaking sterile technique during catheter insertion (p=0.02). Nursing technicians reported following the conduct recommended in the bundle more frequently than the other professionals, although they also mentioned breaking sterile technique more often.

Table 2 presents variables on the professionals' self-reported behavior towards the central venous catheter maintenance bundle, stratified by profession.

Table 2 – Self-reported knowledge on the central venous catheter maintenance bundle – Belo Horizonte, MG, Brazil, 2018.

Variables		Nursing Technician		Nurse		Physician		P-Value
		N	%	N	%	n	%	
Knowledge on the CVC maintenance bundle								
Daily verification of the need for catheter permanence	Completely agree	168	93.86	51	96.23	56	93.33	0.543[1]
	Partially agree	6	3.35	2	3.77	1	1.67	
	Disagree	5	2.79	0	0.00	3	5.00	
Hand hygiene before catheter manipulation	Completely agree	174	97.21	53	100.00	57	95.00	0.071[1]
	Partially agree	5	2.79	0	0.00	1	1.67	
	Disagree	0	0.00	0	0.00	2	3.33	
Cleaning hub or connectors with 70% alcohol	Completely agree	149	83.24	48	90.57	41	68.33	**0.032**[1]
	Partially agree	20	11.17	4	7.55	13	21.67	
	Disagree	10	5.59	1	1.89	6	10.00	
Changing the infusion set	Completely agree	151	84.36	51	96.23	39	66.10	**0.002**[1]
	Partially agree	16	8.94	2	3.77	12	20.34	
	Disagree	12	6.70	0	0.00	8	13.56	
Providing dates for hub or connectors	Completely agree	107	60.11	36	67.92	42	70.00	**0.001**[1]
	Partially agree	22	11.80	14	26.42	13	21.66	
	Disagree	50	28.09	3	5.66	5	8.34	

continue...

...continuation

Variables		Nursing Technician		Nurse		Physician		P-Value
		N	%	N	%	n	%	
Excessive catheter manipulation	Completely agree	128	71.51	48	90.57	53	88.33	**0.006[1]**
	Partially agree	28	15.64	5	9.43	5	8.34	
	Disagree	23	12.85	0	0.00	2	3.33	
Providing dates for the infusion set	Completely agree	150	83.80	49	92.45	44	75.86	0.076[1]
	Partially agree	21	11.73	4	7.55	8	13.79	
	Disagree	8	4.47	0	0.00	6	10.34	
Self-reported behavior on the CVC maintenance bundle								
Daily verification of the need for catheter permanence	Always	143	80.34	37	69.81	40	66.67	0.112[1]
	Nearly always	20	11.24	11	20.75	16	26.66	
	Sometimes	13	7.30	5	9.44	4	6.67	
	Never	2	1.12	0	0.00	0	0.00	
Cleaning hub or connector with 70% alcohol	Always	43	24.02	2	3.77	7	11.60	**0.005[1]**
	Nearly always	36	20.11	10	18.87	11	18.40	
	Sometimes	55	30.73	30	56.60	26	43.40	
	Never	45	25.14	11	20.76	16	26.60	
Previous hand hygiene before catheter manipulation	Always	101	56.42	12	23.08	14	23.34	**0.000[1]**
	Nearly always	46	25.70	18	34.62	17	28.33	
	Sometimes	25	13.97	18	34.61	20	33.33	
	Never	7	3.91	4	7.69	9	15.00	
Infusion set change practice	Always	159	88.82	41	77.36	35	61.41	**0.000[1]**
	Nearly always	17	9.50	12	22.64	12	21.05	
	Sometimes	3	1.68	0	0.00	10	17.54	
	Never	0	0.00	0	0.00	0	0.00	
Previous hand hygiene for bandage change	Always	130	73.03	36	67.92	38	63.30	0.162[2]
	Nearly always	27	15.17	13	24.53	13	21.70	
	Sometimes	14	7.87	4	7.55	9	15.00	
	Never	7	3.93	0	0.00	0	0.00	
Using hood and mask before bandage change	Always	101	56.43	37	69.81	28	47.67	**0.039[2]**
	Nearly always	35	19.55	9	16.98	8	13.33	
	Sometimes	27	15.08	5	9.44	12	20.00	
	Never	16	8.94	2	3.77	12	20.00	

[1] Chi-squared Test; [2]Fisher Exact; [3]Percentage of intervention frequency estimated by the professionals.

The professionals' knowledge on the CVC maintenance bundle included significant differences among groups regarding the following: cleaning hub or connector with 70% alcohol (p=0.032); infusion set change (p=0.002); providing dates for hubs or connectors (p=0.001); avoiding excessive catheter manipulation (p=0.006). For most variables, nurses were more confident in comparison with the other groups. However, the variable "providing dates for connectors" was predominant among physicians, which is noteworthy, since it is frequently attributed to nursing.

The professionals' self-reported behavior towards the CVC maintenance bundle presented significant differences in frequency among groups for the following: cleaning hub or connector with 70% alcohol (p=0.005); previous hand hygiene before catheter manipulation by the area's professionals (p=0.000); infusion set change (p=0.000); using hood and mask during bandage change by the sector's professionals (p=0.039). For most variables, the nursing technicians reported more frequent adoption of behavior recommended in the CVC maintenance bundle. The means are remarkably low for hub or connector cleaning with 70% alcohol, even in the nursing technicians' group (mean=53,77%). This reveals low adherence to this practice, even if most professionals in this group completely agree with the conduct (mean=83.24).

DISCUSSION

In this work, the groups of nursing technicians and nurses presented the highest percentage of individuals receiving training on preventing infections related to CVC; the difference was statistically significant. The investment in training and professional upgrade, as well as the professional's participation in analyzing indexes and building action plans, may interfere in their adherence to actions toward preventing CVC infections. Also, continuous education programs with periodical training for professionals who are directly responsible for CVC-related care may contribute to improving the safety culture and a higher professional commitment to strategies aimed at reducing infection rates[5,9-12].

As for knowledge on the insertion bundle, considering skin preparation, the physician's group presented the smallest percentage of subjects recommending the association of antiseptic and alcoholic solutions. A divergent result was found in another study, which evidenced 100% confidence[13]. The patient's skin preparation with 0.5% chlorhexidine alcoholic

solution is of major importance for reducing catheter-related infections and must be carried out before CVC insertion. Respecting the product's drying time in compliance with the manufacturer's instructions is recommended[5].

The physicians' group, which performs most of the catheter insertion process, presents a smaller agreement rate than the other categories regarding using maximal barrier precaution during CVC insertion. A study which followed the procedures of CVC insertion in neonatal and pediatric intensive care units found results close to 97% confidence in this conduct by the responsible professionals[13].

The nursing technician's group presented higher agreement regarding the usage of maximal barrier precaution to support CVC insertion. A similar result was found in a study conducted in a university hospital ICU in Rio de Janeiro, despite the statistically non-significant differences among professional categories[14]. The authors argue that, to ensure that insertions are safe, it is necessary to interrupt the process if any step is not conducted correctly. The nurse may have autonomy to suspend the elective procedure[14].

Hand hygiene or asepsis before CVC insertion had higher agreement in the nursing technicians' group. Such action must be carried out as a measure to prevent catheter-related infections, since the main microorganisms causing this infection come from the professionals' hands[5]. A study emphasizes that precarious infrastructure, such as access to basins and alcohol gel, lack of time and forgetfulness contribute to low adherence to hand hygiene[15].

Significant differences were also identified for the frequency of waiting for the antiseptic to dry before catheter insertion, and the nursing technicians' group presented the highest percentage of "always" following such conduct, whereas physicians and nurses had higher percentages of "almost always". With this result, failures may be inferred to occur regarding adherence to skin preparation by professionals responsible for its conduction and catheter insertion. It is therefore important to implement training and strategies that reinforce adherence to this practice, whose role in the prevention of catheter infection is supported by much evidence[8].

Reporting that the responsible "sometimes" breaks sterile technique during catheter insertion had higher percentages of frequency among nurses and physicians. This result is alarming, for this conduct directly impacts the patient's skin and bloodstream contamination, contributing to infections[14].

Concerning the professional's self-reported behavior towards the central venous catheter maintenance bundle, although there was no significant difference in the frequency for verifying catheter permanence, there was a significant difference in the mean frequency for this conduct. The nursing technicians' group presented the highest mean. Many authors recommend the team conduct rounds or employ instruments such as checklists for evaluating the need for CVC permanence and immediate removal of the device when no longer necessary[9].

The nurses' group had a higher percentage of frequency for "sometimes" performing connectors or hub cleaning with 70% alcohol in comparison with the other groups. This result is corroborated by a study which included professionals working in a public hospital ICU in Belo Horizonte. It showed little adherence to hub disinfection by the nursing team[14].

The nursing technicians' group presented the highest percentage of frequency for "always" conducting previous hand hygiene before catheter manipulation. In the units where this study was conducted, all boxes have sinks with soap and alcohol, as well as bigger basins in corridors with alcoholic antiseptic solutions for hand hygiene. Therefore, access to materials and infrastructure are not factors which hinder the team's adherence to this measure. A study carried out in a Brazilian ICU concluded that most professionals did not perform hand hygiene at any moment during the observed activities (infusion system change, drug administration and bandage placement and change). Such practice directly impacts quality of assistance, contributing to the emergence of cross infection[13].

Nursing technicians presented a higher percentage of individuals adopting infusion set change and a higher mean percentage for this conduct's frequency. The infusion set change is the nursing technician's responsibility and it is daily checked by the nurse. Such factor may have contributed to the high frequency for "always" performing it in the perspective of these categories. The risk of central line contamination decreases considerably when infusion sets are changed between 72 and 96 hours[5].

Regarding cap and mask usage during bandage change, the nurse's group achieved the highest percentage of frequency for "always" adopting this conduct and the highest mean percentage for this conduct. The fact that this responsibility lies on the nurse might have influenced the result. However, the result was not expressive and showed no adherence by the professionals, which is an aspect to be improved. Implementing the recommended measures for bandage change is important, since in such moment bandages become a portal of entry to microorganisms after catheter insertion[5].

Even though most professionals are aware of some bundle items, self-reported behavior does not match the reported knowledge. Further investigation on the determinants of professionals' behavior is thus necessary to clarify motives, intentions and factors influencing omission of a certain practice while aware of its benefits.

CONCLUSION

The results show deficiencies in the professionals' knowledge and behavior concerning the recommendations. The team's knowledge on the hand hygiene item presented a higher level of awareness both during CVC insertion and maintenance. The usage of chlorhexidine antiseptic, followed by alcoholic and providing a date for hub or connectors, was the item professionals were least aware of. As for behavior, the professionals reported always using the correct attire for catheter insertion; nevertheless, they presented a deficiency on cleaning hub or connectors with 70% alcohol.

Promoting training and permanent education programs to all health professionals engaged in CVC insertion and maintenance is pivotal for preventing bloodstream infection associated to this device. Diagnostics on the team's knowledge and behavior are necessary for implementing actions and developing stronger strategies in the promotion of safety for ICU patients using CVC.

RESUMO

Objetivo: Avaliar conhecimento e comportamento dos profissionais de Unidades de Terapia Intensiva quanto às ações recomendadas no *bundle* de prevenção de infecção de corrente sanguínea relacionada ao cateter venoso central. **Método:** Estudo transversal, descritivo, com abordagem quantitativa, realizado em três Unidades de Terapia Intensiva. Os dados foram coletados por meio de questionário aplicado face-a-face com profissionais de saúde. Utilizou-se o software R 3.3.1 para análise dos dados. **Resultados:** Participaram 292 profissionais. Quanto ao conhecimento, o item higienização das mãos apresentou maior nível tanto no momento da inserção (92,46%) como na manutenção (97,27%). O uso do degermante clorexidina, seguido por alcoólico (47,94%) e datar *hub* ou conectores (19,87%) foram os itens de menor conhecimento. Quanto ao comportamento, os profissionais relataram: sempre usar a paramentação correta para inserção do cateter (84,25%), nunca esperar a secagem do antisséptico antes de inserir o cateter (25,34%) e nunca realizar limpeza do *hub* ou conectores com álcool 70% (23,86%). **Conclusão:** Os resultados demonstram que o conhecimento e comportamento dos profissionais em relação ao *bundle* de cateter venoso central apresentam fragilidades, revelando a importância de incentivar programas de capacitação nesta área do conhecimento.

DESCRITORES

Infecção Hospitalar; Infecções Relacionadas a Cateter; Cateteres Venosos Centrais; Segurança do Paciente; Unidades de Terapia Intensiva; Enfermagem de Cuidados Críticos.

RESUMEN

Objetivo: Evaluar el conocimiento y el comportamiento de los profesionales de la Unidad de Cuidados Intensivos en relación con las acciones recomendadas en el *bundle* de prevención de la infección del torrente sanguíneo relacionada con el catéter venoso central. **Método:** Estudio descriptivo transversal, con enfoque cuantitativo, realizado en tres Unidades de Cuidados Intensivos. Los datos se reunieron mediante un cuestionario presencial aplicado a profesionales de la salud. Se utilizó el software R 3.3.1 para el análisis de los datos. **Resultados:** Participaron 292 profesionales. En cuanto al conocimiento, el tema de la higiene de las manos presentó un nivel más alto tanto en el momento de la inserción (92,46%) como en el mantenimiento (97,27%). El uso del antiséptico clorhexidina, seguido por el alcohol (47,94%) y la datación de *hub* o conectores (19,87%) fueron los elementos de menor conocimiento. En cuanto a la conducta, los profesionales informaron: siempre usar la vestimenta correcta para la inserción del catéter (84,25%), nunca esperar a que el antiséptico se seque antes de insertar el catéter (25,34%) y nunca limpiar el *hub* o los conectores con alcohol al 70% (23,86%). **Conclusión:** Los resultados muestran que el conocimiento y el comportamiento de los profesionales en relación con el *bundle* sobre el catéter venoso central presentan debilidades, lo que revela la importancia de fomentar programas de formación en esta área de conocimiento.

DESCRIPTORES

Infección Hospitalaria; Infecciones Relacionadas con Catéteres; Catéteres Venosos Centrales; Seguridad del Paciente; Unidades de Cuidados Intensivos; Enfermería de Cuidados Críticos.

REFERENCES

1. Allen-Bridson K. NHSN Central Line-associated bloodstream infection surveillance in 2014. NHSN training 2014 [Internet]. Washington: CDC; 2014 [cited 2019 Feb 02]. Available from: http://www.cdc.gov/nhsn/PDFs/training/training-CLABSI-2014-with-answersBW.pdf
2. World Health Organization. Clean Care is Safer Care. The burden of health care-associated infection worldwide [Internet]. Geneva: WHO; 2018 [cited 2019 Nov 12]. Available from: https://www.who.int/gpsc/country_work/burden_hcai/en/
3. National Healthcare Safety Network. Patient safety component manual [Internet]. Washington: CDC; 2017 [cited 2019 Nov 12]. Available from: https://www.cdc.gov/nhsn/pdfs/pscmanual/pcsmanual_current.pdf
4. Brasil. Ministério da Saúde; Agência Nacional de Vigilância Sanitária. Avaliação dos indicadores nacionais das Infecções Relacionadas à Assistência à Saúde (IRAS) e resistência microbiana do ano de 2016. Brasília: ANVISA; 2017.
5. O'Grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, et al. Guidelines for the prevention of intravascular catheter-related infections. Clin Infect Dis [Internet]. 2011 [cited 2019 Mar 29];52(9):162-93. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3106269/
6. Santos SF, Viana RS, Alcoforado CLGC, Campos CC, Matos SS, Ercole FF. Ações de enfermagem na prevenção de infecções relacionadas ao cateter venoso central: uma revisão integrativa. Rev SOBECC [Internet]. 2014 [citado 2019 mar. 30];19(4):219-25. Disponível em: http://sobecc.org.br/arquivos/artigos/2015/pdfs/v19n4/SOBECC_v19n4_219-225.pdf
7. Araújo FL, Manzo BF, Costa ACL, Corrêa AR, Marcatto JO, Simão DAS. Adherence to central venous catheter insertion bundle in neonatal and pediatric units. Rev Esc Enferm USP. 2017;51:e03269. DOI: http://dx.doi.org/10.1590/S1980-220X2017009603269
8. Brasil. Ministério da Saúde; Agência Nacional de Vigilância Sanitária. Medidas de Prevenção de Infecção Relacionada à Assistência à Saúde. Brasília: ANVISA; 2017.
9. National Institute for Health and Care Excellence. Infection prevention and control: quality standard [Internet]. London: NICE; 2014 [cited 2019 Mar 30]. Available from: https://www.nice.org.uk/guidance/qs61/resources/infection-prevention-and-control-pdf-2098782603205
10. Infusion Nurses Society Brazil. Diretrizes Práticas para Terapia Infusional [Internet]. São Paulo: INS; 2013 [citado 2019 mar. 30]. Disponível em: http://www.insbrasil.org.br/ins/
11. Cooper K, Frampton G, Harris P, Jones J, Cooper T, Graves N, et al. Are educational interventions to prevent catheter-related bloodstream infections in intensive care unit cost-effective? J Hosp Infect. 2014;86(1):47-52. DOI: 10.1016/j.jhin.2013.09.004
12. Oliveira FT, Stipp MAC, Silva LD, Frederico M, Duarte SCM. Behavior of the multidisciplinary team about Bundle of Central Venous Catheter in Intensive Care. Esc Anna Nery [Internet] 2016 [cited 2019 Mar 31];20(1):55-62. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-81452016000100055
13. Oliveira FJ, Menezes LST, Caetano JA, Silva VM, Oliveira MLB, Machado JJA. Avaliação das práticas de adesão à higienização das mãos relacionadas com linhas vasculares em uma Unidade de Terapia Intensiva. Vigil Sanit Debate [Internet]. 2015 [citado 2019 mar. 30];3(4):55-61. Disponível em http://www6.ensp.fiocruz.br/visa/?q=node/6943

14. Silva AG, Oliveira AC. Adesão às medidas para prevenção da infecção da corrente sanguínea relacionada ao cateter venoso central. Enferm Foco [Internet] 2017 [citado 2019 mar. 30];8 (2):36-41. Disponível em: http://revista.cofen.gov.br/index.php/enfermagem/article/view/977/378

15. Rynga D, Kumar S, Gaind R, Rai AK. Hand hygiene compliance and associated factors among health care workers in a tertiary care hospital: self-reported behaviour and direct observation. Int J Infect Control. 2017;13(1):1-9. DOI: https://doi.org/10.3396/ijic.v13i1.17137