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BUNDLE FOR THE PREVENTION OF BLOODSTREAM INFECTION

BUNDLE PARA A PREVENÇÃO DE INFECÇÃO DE CORRENTE SANGUÍNEA

BUNDLE PARA LA PREVENCIÓN DE INFECCIÓN DE CORRIENTE SANGUÍNEA

Marianna Saba Fernandes¹, Marília Saba Fernandes², Higina Kelly Lemos Nogueira³, Fernanda Souza Pontes⁴,
Ângela Cristina Fagundes Góes⁵, Daniela Fagundes de Oliveira⁶

ABSTRACT

Objective: to verify the knowledge of intensive care professionals about the bundle for the prevention of bloodstream infection related to the central venous catheter and about the care in handling this device.

Method: this is a cross-sectional quantitative study in a public hospital with the participation of 82 health professionals from the intensive care team. Absolute and relative frequencies were used for data analysis, and the results are presented in the tables. **Results:** the knowledge about the bundle was reported by 53.6% of the sample; 53.6% indicated that the subclavian vein was the first site of choice for insertion of central catheters, while 25.6% responded to the jugular vein. In relation to catheter maintenance, 51.6% of nursing professionals stated that they performed between three and seven bundle-recommended care, while 11.3% reported adopting up to two care only. **Conclusion:** although most respondents showed satisfactory knowledge regarding bundle and catheter care, a significant percentage of the sample showed still fragile features.

Descriptors: Infection; Central Venous Catheterization; Patient safety; Intensive Care Units; Knowledge; Patient Care Team.

RESUMO

Objetivo: verificar o conhecimento dos profissionais intensivistas sobre o *bundle* para a prevenção de infecção de corrente sanguínea relacionada ao cateter venoso central e sobre os cuidados no manejo deste dispositivo. **Método:** trata-se de um estudo quantitativo, de corte transversal, em um hospital público, com a participação de 82 profissionais da saúde da equipe intensivista. Utilizaram-se, para a análise dos dados, frequências absolutas e relativas, e se apresentam os resultados em tabelas. **Resultados:** relatou-se o conhecimento quanto ao *bundle* por 53,6% da amostra; 53,6% apontaram a veia subclávia como primeiro sítio de escolha para a inserção de cateteres centrais, enquanto que 25,6% responderam a veia jugular. Evidenciou-se, em relação aos cuidados para a manutenção do cateter, que 51,6% dos profissionais de Enfermagem afirmaram realizar entre três e sete cuidados recomendados pelo *bundle*, enquanto 11,3% referiram adotar apenas até dois cuidados. **Conclusão:** adverte-se que, embora a maior parte dos entrevistados tenha mostrado um conhecimento satisfatório em relação ao *bundle* e aos cuidados no manejo dos cateteres, um percentual significativo demonstrou fragilidades ainda existentes. **Descritores:** Infecção; Cateterismo Venoso Central; Segurança do Paciente; Unidades de Terapia Intensiva; Conhecimento; Equipe de Assistência ao Paciente.

RESUMEN

Objetivo: verificar el conocimiento de los profesionales intensivistas sobre el bundle para la prevención de infección de corriente sanguínea relacionada al catéter venoso central y sobre los cuidados en el manejo de este dispositivo. **Método:** se trata de un estudio cuantitativo, de corte transversal, en un hospital público, con la participación de 82 profesionales de la salud del equipo intensivista. Se utilizaron, para el análisis de los datos, frecuencias absolutas y relativas, y se presentan los resultados en tablas. **Resultados:** se reportó el conocimiento sobre al bundle por el 53,6% de la muestra; 53,6% señalaron la vena subclavia como primer lugar de elección para la inserción de catéteres centrales, mientras que el 25,6% respondieron a la vena yugular. Se evidenció, en relación con los cuidados para el mantenimiento del catéter, que el 51,6% de los profesionales de Enfermería afirmaron realizar entre tres y siete cuidados recomendados por el bundle, mientras que el 11,3% refirieron adoptar sólo hasta dos cuidados. **Conclusión:** se advierte que, aunque la mayoría de los entrevistados han mostrado un conocimiento satisfactorio en relación con el bundle y a los cuidados en el manejo de los catéteres, un porcentaje significativo demostró fragilidades aún existentes. **Descritores:** Infección; Cateterismo Venoso Central; Seguridad del Paciente; Unidades de Cuidados Intensivos; Conocimiento; Grupo de Atención al Paciente.

^{1,2,3,4}Specialists, State University of Bahia / UEBA. Salvador (BA), Brazil. E-mail: nannasaba@hotmail.com ORCID iD: <https://orcid.org/0000-0002-8670-6674>; E-mail: marilia_saba_fernandes@hotmail.com ORCID iD: <https://orcid.org/0000-0003-4532-102X>; E-mail: higinakelly@hotmail.com ORCID iD: <https://orcid.org/0000-0002-5466-7850>; E-mail: fernanda_sp5@hotmail.com ORCID iD: <https://orcid.org/0000-0002-8792-186X>; ⁵Master, State University of Bahia / UEBA. Salvador (BA), Brazil. E-mail: agoes@uneb.br / angelacfgoes@gmail.com ORCID iD: <https://orcid.org/0000-0002-0667-0545>; ⁶Master, Federal University of Bahia / UFBA. Salvador (BA), Brazil. E-mail: danielaefagundes@hotmail.com ORCID iD: <https://orcid.org/0000-0003-4804-7257>

INTRODUCTION

It is understood from the earliest times that the act of caring can generate some kind of harm, however, the movement for patient safety only began in the last decade of the twentieth century with the publication of the report of the Institute of Medicine in the USA, *To err is Human: building a safer health system*, which revealed the state of care in that country.¹

From this knowledge, in 2004, the World Alliance for Patient Safety was created by the World Health Organization (WHO), with the objective of disseminating knowledge and launching programs on this subject.²

On April 1, 2013, the National Patient Safety Program (NPSP) was established in Brazil, through Ministerial Ordinance No. 529/2013, with the general objective of "contributing to the qualification of health care in all health facilities in the national territory".³

Among the main concerns in the area of Patient Safety and quality of service offered, the reduction in the number of infections related to health care, which are those acquired in a hospital or other health caution.⁴

The "Five Million Lives" campaign was launched in 2006 by the Institute for Healthcare Improvement, featuring 12 interventions to provide better, safer, more effective, patient-centered health care to reduce the damages related to the care process.⁵ Among the interventions proposed, prevention of bloodstream infections through a central venous catheter.

The National Program for Prevention and Control of Infections Related to Health Care (NPPCIRHC) was established in September 2013, with the general objective of reducing the number of infections related to care, one of its specific objectives being to reduce Primary Bloodstream Infection (PBSI), which may have serious systemic consequences, such as bacteremia or sepsis, the main risk factor for which is the use of central venous catheters.⁶

The PBSI occurs by the extraluminal means by contamination at the moment of insertion of the catheter or the formation of a biofilm in the external face of the device with the microbiota of the skin, presenting usually in two weeks, or by the intraluminal means due to the inadequate hygiene of the connections or the infusion of contaminated fluids, usually occurring after the second week. It is added that another less common route is hematogenic dissemination.⁷

In order to reduce the number of bloodstream infections related to the use of central venous catheter, the use of a set of established practices based on scientific evidence (Bundle) by the HCII (Health Care Improvement Institute) with the intent to offer better quality care through the standardization of care and reduction of incidences of infections related to the use of this venous device⁸. In this perspective, it is ensured by the actions recommended by the bundle, a safe care for the patient, consequently leading to a reduction in the number of primary bloodstream infections, as well as in hospital costs and length of hospital stay.

It is believed that patients admitted to Intensive Care Units are submitted to a greater number of invasive procedures, which predisposes them to a greater number of infections and, consequently, hospitalization time, cost and high morbidity and mortality.⁹ In this way, we answer the following question: what is the knowledge of intensive care professionals about the bundle for the prevention of bloodstream infection related to the use of a central venous catheter and about the care taken in handling this device?

OBJECTIVE

- To verify the knowledge of intensive care professionals about the bundle for the prevention of central venous catheter-related bloodstream infection and about the care taken in handling this device.

METHOD

It is reported that this research was part of an umbrella project called Patient Safety in Intensive Care Units: a multiprofessional approach presented to the Intensive Care Unit of the Multiprofessional Health Residency Program of the State University of Bahia / UNEB.

This is a quantitative cross-sectional study, in the year 2015, in Intensive Care Units (ICUs) of a large public hospital in the city of Salvador, Bahia, Brazil. A sample of 82 professionals, including nurses, nursing technicians, physicians and physiotherapists working in at least one of the selected units (Clinical ICU, Surgical ICU and Coronary ICU).

The following inclusion criteria were adopted: health professionals who provide direct assistance to the patient, who are active in the study units and were not away from their activities for vacations or leave during the period of data collection.

A self-administered questionnaire, anonymous, structured in two sections was applied as instrument of data collection: characterization of health professionals and verification of knowledge about the bloodstream infection prevention bundle and the care to be provided in daily care to the The study was carried out by the Research Ethics Committee of the State University of Bahia (CEP / UNEB) under opinion no. 1,020,486 / 2015. Data collection began after authorization from the hospital locus of the research. The Free and Informed Consent Form was signed by all the professionals who accepted to participate in the study, including the procedures that would be performed and the contact of the researchers.

The data, after the collection and the conference, were typed into Microsoft Access 2003 by exporting them to the Statistical Package for Social Sciences (SPSS), version 19 statistical software for the treatment and

generation of results. Descriptive analyzes (percentage indices) were performed using tables containing absolute (n) and relative (%) frequencies. Confidence intervals were considered at 95%.

RESULTS

A complete questionnaire was provided to the 82 professionals at the research locus, however, some did not respond to all questions contained in the instrument, leading to the emergence of • values added to the title “no response”.

♦ Characterization of professionals

It was observed, as far as the data that characterized the professionals participating in the research were concerned (Table 1).

Table 1. Characterization of the health professionals of the Intensive Care Units of a public hospital. Salvador, BA, 2015.

Variables	n	%
Age		
Up to 25 years	9	11.0
Between 25 and 30 years	11	13.4
Between 30 and 40 years	45	54.9
Over 40 years	17	20.7
Profession		
Nursing technician	31	37.8
Nurse	31	37.8
Doctor	5	6.1
Physiotherapist	15	18.3
Completion of the training course		
< 2 years	9	10.9
2 to 5 years	11	13.4
5 to 10 years	23	28.0
10 to 15 years	14	17.0
15 years	10	12.2
Did not answer	15	18;3
Has a postgraduate course		
Yes	44	53.6
No	15	18.3
Did not answer	23	28.1
Time working at the ICU		
Up to 1 year	6	7.3
1 to 2 years	11	13.4
2 to 5 years	18	22.0
5 a 10 years	26	31.7
> 10 years	20	24.4
Did not answer	1	1.2
Course on patient safety		
Yes	40	48.8
No	42	51.2

◆ **Getting to know the bloodstream infection prevention bundle**

It was found that 44 (53.6%) responded that they were already familiar with the package of measures and, regarding the benefits of the application, 53 (40) , 2%) answered that they had benefits and 27 (32.9%) did not respond.

When questioned about the site of choice for insertion of a central venous catheter, 44 (53.6%) of the respondents answered a subclavian vein, while 21 (25.6%) responded to a jugular vein and 12 (14.6%) did not respond.

It was then questioned about continuing education with the team, and the non-existence of this practice at the research institution was answered by 43 employees (52.4%).

◆ **Care of insertion of the central venous catheter**

Regarding the adoption of care in the installation of the catheters, medical professionals were asked about the ways they were used to minimize the occurrence of bloodstream infection during the passage of these central catheters, and the nurses and technicians were asked about the care observed during the installation of this device. It is detailed that this question was not answered by the physiotherapists, who said that they were not part of that moment in patient care.

Adequate hand hygiene, maximum barrier precautions, skin antisepsis with chlorhexidine gluconate, use of antibiotic and antiseptic impregnated catheters, use of ultrasound equipment for CVC insertion and exchange of the catheter inserted in the emergency room as care to be observed in the insertion of CVC, as shown in table 2.

Table 2. Care taken and observed during the insertion of CVC according to the professionals of Intensive Care Units of a public hospital. Salvador, BA, 2015.

Variables	Doctors		Nurses	
	n	%	n	%
Scored only 1 care	-	-	12	19.3
2 to 5 cares	3	60	48	77.4
All care	1	20	2	3.2
No reply	1	20	-	-

◆ **Maintenance of the central venous catheter**

Most care is performed in the maintenance of the CVC by the Nursing team and these were the most representative professionals numerically in the sample. For this reason, this item was directed to this category of professionals.

The bundle is recommended during maintenance of the central venous catheter for the prevention of primary current related to the catheter: hygiene of the hands before

and after contact with the CVC; the use of gloves in the handling of the catheter; friction of catheter connections with antiseptic; performing dressing at the CVC insertion site with alcoholic chlorhexidine and sterile gauze or transparent semipermeable film; maintenance of routine equipment and connector exchanges identifying them, in addition to the daily evaluation of the need for maintenance of the same (Table 3).

Table 3. Care taken in the maintenance of the central venous catheter according to the Nursing professionals (nurses and nursing technicians) of Intensive Care Units of a public hospital. Salvador, BA, 2015.

Variables	N= 62	%
You have marked up to two	7	11.3
You marked 3 to 7 cares	32	51.6
He pointed out all the cares	22	35.4
No reply	1	1.6

Table 4 shows the care taken by nurses to reduce bloodstream infection related to central catheters in Intensive Care Units.

Table 4. Care taken by nurses for the reduction of bloodstream infection related to central catheters in Intensive Care Units of a public hospital. Salvador, BA, 2015.

Variables	n	%
Exchange of dressing with sterile gauze		
24 hours	26	83.8
48 hours	5	16.1
72 hours	-	-
Did not answer	-	-
Replacement of sterile clear semipermeable cover		
3 days	1	3.2
5 days	18	58.1
7 days	12	38.7
More than 7 days	-	-
Did not answer	-	-

DISCUSSION

♦ Characterization of the participating professionals

It was found that the largest number of participants in this research was composed by the Nursing staff (technician and nurse), which was already expected, since they correspond to the highest number in the staff working on duty at an Intensive Care Unit.

It should be noted that the most prevalent graduation time was between five and ten years (28%), with the majority of professionals having a postgraduate course (53.6%) and working in the Intensive Care Unit more than five years (56.1%), which portrays the profile of a professional with more knowledge (theoretical and practical) and experience in the area.

It is noted, therefore, the existence of experienced professionals in the areas of Intensive Therapy with the need for permanent education for the improvement and acquisition of new theoretical and practical knowledge.

♦ Knowing the bloodstream infection prevention bundle

It is shown that the existence of a bundle guides the healthcare professional regarding the care that should be taken during patient care. The bundle is composed of five components: hand hygiene; maximum barrier during catheter passage; antisepsis with chlorhexidine; adequate insertion site and daily reassessment of the need for catheter maintenance.¹⁰⁻¹

It is noticed that the greater number of professionals reported being aware of the existence of the bundle of bloodstream infection related to the use of central catheters and recognizes that its application in the unit can bring benefits to the patients, as well as, assertively, pointed the subclavian as a site first choice for the CVC. A similar result was found in a study conducted at a University Hospital of Rio de Janeiro, with the

objective of analyzing the behavior of the Nursing and medical team related to the bundle, which found a percentage of hits of 53.1% regarding the site insertion in subclavian.¹¹

It was found, however, in this study that some participants (14.6%) did not answer the question and this may reflect the lack of knowledge about the subject. It should be noted that this lack of knowledge, in turn, may be a consequence of the lack of permanent education initiatives in the research units, as indicated by 52.4% of those interviewed, who affirm that they do not participate in such initiatives. In a study carried out in Japan, the objective was to evaluate the impact of an educational program on the reduction of bloodstream infections in ICU, a reduction in the incidence of infection, as well as a decrease in hospital expenses, concluding the impact of ongoing training with health professionals to improve patient care.¹²

The central venous catheter can be inserted into the jugular, subclavian or femoral veins. It is verified, according to the literature, that the site of choice for the insertion of the CVC is the subclavian and, later, the jugular and femoral veins, since the first one presents high risk for the colonization and is close to secretions of the oropharynx, as well as the difficulty in fixation, and the second one presents high colonization, besides offering a greater risk of deep venous thrombosis.¹¹⁻¹³

It is necessary the knowledge of this bundle to maximize the actions of prevention of bloodstream infection, observing the need for professional improvement in the health services on the subject in order to bring more knowledge and updates to the professionals and, in this way, contribute to the reduction of the rate of primary bloodstream infections.

♦ Care of insertion of the central venous catheter

It is verified that care is taken in relation to the moment of insertion of the CVC in

order to avoid infections by the extraluminal means of the device, besides those contained in the bundle, namely: the exchange of the catheter inserted in the emergency room, the use of catheters impregnated with antibiotics and antiseptics and the use of ultrasound equipment for the insertion of CVC.¹⁴⁻⁶

It was verified that a higher percentage of professionals indicated that all the care recommended by the bundle of bloodstream infection associated with the central venous catheter was inserted at the time of insertion, 60% of the physicians and 77.4% of the professionals of the Nursing team. However, it was pointed out, even though some professionals of the Nursing team (19.3%) affirmed that only one care recommended during the insertion of the central venous catheter by the medical professional was performed. Therefore, a discrepancy was identified between what the medical professional indicated as adopted care and what some Nursing professionals pointed out as observed care, which may suggest that the medical professional, despite knowing the preventive measures, did not perform them or that there was no adequate participation of the nursing professional at the time of insertion of the device.

It is necessary, in order to reduce the rates of primary bloodstream infections, to adopt the care recommended in the bundle now of insertion of the catheter by the medical professional, as well as the participation and the support of the Nursing team at the moment, in order to minimize the risks of catheter infection at the time of venipuncture. A study was carried out in Belo Horizonte, Minas Gerais, Brazil, with ICU health professionals, with the objective of verifying adherence to bloodstream infection prevention measures, where there were 100% correct conducts in hand hygiene, in the use of the maximum barrier of precaution and asepsis of the patient's skin, demonstrating that the medical team correctly followed the use of the recommended measures in the insertion of the CVC.¹⁷

♦ Maintenance of the central venous catheter

Infection of primary current related to the catheter, in addition to contamination at the time of insertion, can occur through the intraluminal means of the catheter. Therefore, some care should be taken during maintenance of this catheter, such as hand hygiene before and after contact with the CVC, friction of the catheter connections with antiseptic, 18 use of gloves in the catheter handling, 17 the dressing at the CVC insertion

site with alcoholic chlorhexidine and sterile gauze or semipermeable transparent film, maintenance of routine equipment and connectors exchange and the identification of the same, besides the daily evaluation of the need for maintenance of the same.¹³⁻⁵

It was affirmed, by 51.6% of the Nursing professionals surveyed, about the care taken during the maintenance of the central venous catheter, the adoption between three and seven care recommended by the bundle. However, 11.3% of the professionals reported up to two recommended care only. This is a cause for concern, since the prevention of bloodstream infection also depends on the care taken during the manipulation of this catheter, and the nursing team is the one that most handles this device. In a study conducted in the United States, in order to determine the relationship between bundle adherence rates and bloodstream infection, the greater the implementation of the points established in the package of measures by health professionals, the greater the reduction in the incidence of infection associated with central catheters, reinforcing the importance of adopting the correct measures in patient care.¹⁹

The CVC dressing is performed by the Nursing team, which can be done with sterile gauze or sterile transparent film, and there is no statistical difference on the increase of infections related to the type of sterile cover adopted¹⁷. The performance of a dressing or other is determined by the characteristics of the skin and the sensitivity of the patient or if there is secretion or bleeding at the puncture site.

It is recommended by literature to exchange the dressing every 48 hours with sterile gauze and, every seven days, the sterile transparent film, 14-7 unless the dressing shows detachment or dirtiness. However, the results of this study differ from the data obtained in the literature, since, according to the respondents, the dressing is replaced with sterile gauze daily (83.3% %) and transparent film exchange every five days (58.1%), in addition to protecting the dressing during patient hygiene (54.8%), leaving it exposed to moisture. It is explained, therefore, that the lower the manipulation of the catheter, a reduction in the risk of infection occurs, and it is preferable that the dressing is not changed daily giving preference to the transparent sterile film, since, in addition to remaining allows visualization and daily evaluation of the catheter ostium.

CONCLUSION

Patient Safety is a subject that, although it has existed for some years, has been better studied and disseminated by the academy since the end of the last century, in order to reduce the risks to which patients become exposed during hospital stay period.

It is known that primary infection of the bloodstream, in addition to bringing comorbidities associated with the patient's underlying disease, also prolongs the costs and the length of hospitalization, bringing greater risk to the patient. It is necessary, as it is preventable, the adoption of actions that aim to minimize its incidence and its associated risks.

It was observed that, although most of the professionals participating in the research claim to be aware of the existence of the bundle of prevention of bloodstream infection, a significant percentage of professionals are not yet aware about the items that comprise it and are unaware of the care they should be adopted during maintenance, as identified in the questions about routine dressing change and the choice of CVC insertion site.

As a limitation found in the study, the cross-sectional design, which does not allow the establishment of cause and effect relationships, is cited. It is inferred, however, that the results found provide useful elements, which may allow for discussions on the subject based on evidence in the described population, reflecting on the importance of safety culture among health professionals and encouraging coordination on the importance of carrying out permanent education in the Intensive Care Units, with the sharing of knowledge about the bundle and, consequently, the awareness of the employees regarding the provision of safer assistance. In addition, further research on the subject can be supported by this study.

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Corresponding Address

Marianna Saba Fernandes
Universidade do Estado da Bahia
Rua Silveira Martins, 2555
CEP: 41150-000 – Salvador (BA), Brazil