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RESEARCH

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CARE BUNDLE FOR BOTH PREVENTION AND CONTROL OF HOSPITAL-ACQUIRED INFECTION IN ADULT EMERGENCY SERVICE

Bundle de cuidados para a prevenção e o controle de infecção hospitalar em serviço de emergência adulto

Paquete de cuidado con control de prevención y / o infección control de hospital en servicio de emergencia para adultos

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Juliana Krum Cardoso da Silva[1], *Eliane Matos*[2], *Sabrina da Silva de Souza*[3]

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ABSTRACT

Objective: develop a care bundle in order to help preventing and controlling hospital infections in emergency care units, based on the knowledge and practice of health professionals, as well as on scientific evidences available in the literature. **Method:** The study was carried out through the application of a survey comprising 52 health professionals working in the multi-professional team of the aforementioned hospital. The data from the survey were discussed in "Here-and-Now" groups. It was approved by CEPSH / UFSC with CAAE: 56390616.0.0000.0121. **Results:** the three most significant aspects composing the care bundle were selected based on data derived from the survey, from the groups and from the literature, namely: hand hygiene; use of personal protection equipment; and asepsis of materials and equipment. **Conclusion:** using the bundle allows inform, guide, as well as to improve habits and remind health teams about the need to adhere to measures able to make the health care practice more qualified and safer for both the patients and the professionals.
Descriptors: Infection; Universal precautions; Emergencies

1 Nursing Graduate by the *UFSC*, MSc in Nursing Care Management by the *UFSC*, Nurse at the University Hospital named *Professor Polydoro Ernani de São Thiago*.

2 Nursing Graduate by *UFSC*, PhD in Nursing by the *UFSC*, Retired nurse from the University Hospital named *Professor Polydoro Ernani de São Thiago*.

3 Nursing Graduate by the *UFSC*, PhD in Nursing by the *UFSC*, Nurse at the University Hospital named *Professor Polydoro Ernani de São Thiago*.

RESUMO

Objetivo: elaborar um *bundle* de cuidados para a prevenção e o controle das infecções hospitalares em unidade de emergência, com base no conhecimento e prática dos profissionais de saúde e nas evidências científicas disponíveis na literatura. **Método:** pesquisa convergente assistencial, realizada em um serviço de emergência adulto de um hospital geral universitário localizado em uma capital do Sul do Brasil com aplicação de um *Survey* para 52 trabalhadores da equipe multiprofissional e posterior discussão em grupos "Aqui e Agora".Foi aprovado pelo CEPSH/UFSC com CAAE: 56390616.0.0000.0121. **Resultados:** emergiram três aspectos mais significativos que compuseram o *bundle de cuidados*: higienização das mãos; uso de equipamentos de proteção individual; e assepsia de materiais e equipamentos. **Conclusão:** a utilização do *bundle* permite informar, orientar, melhorar hábitos e relembrar a equipe de saúde sobre a necessidade de aderir a atitudes que tornem o cuidado realizado mais qualificado e seguro, tanto para o paciente, quanto para o profissional.

Descritores: Infecção hospitalar; Precauções universais; Emergência.

RESUMÉN

Objetivo: elaborar un bundle de cuidados para la prevención y el control de las infecciones hospitalarias en unidad de emergencia, con base en el conocimiento y práctica de los profesionales de salud y en las evidencias científicas disponibles en la literatura. **Método:** se realizó con aplicación de un Survey de que participaron 52 trabajadores del equipo multiprofesional. Los datos de Survey fueron discutidos posteriormente en grupos "Aquí y Ahora". Fue aprobado por el CEPSH / UFSC con CAAE: 56390616.0.0.0000.0121. **Resultados:** en base a los datos de Survey, de los grupos y de la literatura se seleccionaron los tres aspectos más significativos que compusieron el bundle de cuidados: higienización de las manos; uso de equipos de protección individual; y asepsia de materiales y equipos. **Conclusión:** la utilización del bundle permite informar, orientar, mejorar hábitos y recordar el equipo de salud sobre la necesidad de adherir a actitudes que hagan del cuidado realizado más calificado y seguro, tanto para el paciente, como para el profesional.

Descritores: Infección hospitalaria, Precauciones universales, Urgencias médicas

INTRODUCTION

The bundle has been described as a set of evidence-based interventions in which there are three to five care that must be performed together, with the intention to improve the patient's health condition. In most situations, where it is used, the bundle is directly linked to issues involving patient safety.[1-3]

The use of the bundle has been extended over the years by the simplicity of execution, presenting simple care that usually do not overwhelm the work of the professionals involved.[4] In the case of a hospital emergency, this characteristic of the bundle is fundamental, especially in addressing issues such as hospital infections, which occur throughout the hospital environment, but gain important dimensions in emergencies due to the high demand of patients and work, and also by the structure itself and service dynamics.

Hospital-acquired infections cause a high morbimortality rate in hospital institutions. In addition to the increased hospitalization time and costs, they cause a great concern and awake the need to search for the means to control this issue.[5]

The growth of hospital-acquired infections by multidrug-resistant bacteria has been progressive in the last decades, presenting aggravating factors depending on the unit involved. In emergency services, which have unique characteristics such as living with overcrowding; the high demand and the need of health professional work; inadequate and insufficient facilities to accommodate patients in an organized and safe manner; number of patients always greater than the number of beds, with accommodation of patients on stretchers, which are kept very close, without respecting the necessary distance, this is a very important problem.[6]

The research proposal arises from this reality, which it is to develop a bundle of care in the prevention and control of hospital-acquired infections.

The studies that discuss the composition of bundles indicate that the choice of care must take into account the ease of application and adherence of the health team, and thus, make the use feasible and the measures more effective in the search for improvement of reality in short, medium and long-term.[7]

Bundles have been successful in most of the related studies, but there are also stories of failure, often due to the poor adherence or poor applicability. The success of these care packages is related to team's participation in their idealization and in rethinking and remodeling of some work processes with their use, besides the continuous reassessment of these processes. Bundles are not universally applicable and may not be applicable in a variety of situations, but they are tools that should be used in conjunction with several others. What is important is that, in situations where their use is relevant, they will bring ease and improvement in the quality of the care provided.[7]

Therefore, considering the relevance of the topic and the need to elaborate measures that help contain the spread of infections in hospital environments, and also taking into account the challenges of this task in an emergency unit, this study aimed to elaborate a bundle of care for prevention and control of hospital infections in an adult emergency service. It was based on the knowledge and practice of health professionals and on a review of the literature, which sought available scientific evidence on health professionals' actions in the control of hospital-acquired infection in emergency service.

METHODS

The *Pesquisa Convergente Assistencial (PCA)* [Convergent Care Research] method was performed at an adult emergency service of a general university hospital located in a state capital of Southern Brazil. The *PCA* is characterized by joining the study and theory with professional practice, in which the researcher extracts from the daily routine the question to be investigated, seeking to solve or minimize real problems, making changes and/or introducing innovations in the context of practice.[8]

Professional nursing, medical, social work, psychology and nutrition professionals participated in the study, as well as residents who were working in the adult emergency unit, with a total of 52 professionals.

Data collection took place in three stages. The first stage consisted of conducting an online questionnaire, Survey. An electronic correspondence was sent to the health professionals at the study site, which included an invitation letter, the Free and Informed Consent Term and a link to the Survey, which consisted of the term and the following questionnaires: Sociodemographic Questionnaire, Knowledge Questionnaire on Standard Precautions and the Standard Precautions Adherence Questionnaire. Data analysis was realized by simple statistics, considering the frequency of responses by the online tool *Survey Monkey®*, and analyzed descriptively.

The second stage was an integrative review of the literature, which questioned the actions that have been carried out by the health professionals to control hospital-acquired infections in the adult emergency service, and helped to scientifically evidence the care listed for the bundle.

In the third stage, "Here-and-Now" groups were conducted for socialization of data, discussion and collective construction of the care bundle, which encompassed the health professionals included in the Survey data collection phase who were interested and/or accepted the invitation to participate of the groups, during working hours, in moments deemed appropriate by the researcher. The "Here-and-Now" groups were developed and characterized by being socio-educational, dynamic, formed at any day and time, according to the participants' availability, presenting beginning, middle and end, which are feasible in a dynamic and unpredictable sector such as the emergency. It is an exchange of experiences between people who share similar problems, with the facilitation of a professional of the health team, and thus promoting education and stimulating positive changes in attitudes among participants.[9]

Professionals involved in this study followed a pre-established script and were registered by the researcher in the field diary.

The data collection took place over the period from August 1st, 2016, to January 27th, 2017, its analysis occurred simultaneously and consisted of four processes: apprehension, synthesis, theorization, and transference. Although described separately, the first three phases are intertwined with each other.[8] For the purpose of performing the analysis and interpretation of the data set, several readings of all collected material were accomplished. Tables containing the information from the Survey and the "Here-and-Now" groups were organized and a relationship was sought among the data and the assistance provided at the adult emergency service.

The initial analysis and categorization of this information pointed to four categories, three of them comprised the care bundle for the prevention and control of hospital-acquired infection in an adult emergency service, one of which was excluded because it was a management action (Permanent Education), and thus does not meet the criteria that a care component of a bundle must have.

The choice of bundle care should take into consideration the ease of application and adherence of the health team, with the aim of making feasible use and the most effective measures in the search for improvement of reality in the short, medium and long-term.[7]

The care listed in the bundle was submitted for analysis according to the levels of evidence.[10] This analysis classifies the level of evidence and critically evaluates the results which have been applied for the preparation of studies, that will be used in the confection of products that may be incorporated into clinical practice for the improvement of the care provided.[10] At level 1, evidence comes from a systematic review or meta-analysis of relevant randomized controlled trials or from clinical guidelines based on systematic reviews of randomized controlled trials; level 2, evidence derived from at least one well-delineated randomized controlled trial; level 3, evidence obtained from well-designed clinical trials without randomization; level 4, evidence from well-delineated cohort and case-control studies; level 5, evidence originating from a systematic review of descriptive and qualitative studies; level 6, evidence derived from a single descriptive or qualitative study; level 7, evidence from the opinion of authorities and/or report of expert committees.

The study was authorized by the institution researched and submitted to the approval of the Human Research Ethics Committee from the *Universidade Federal de Santa Catarina*, according to the No. 56390616.0.3001.5360 and the Resolution No. 510/2016.[11]

RESULTS AND DISCUSSION

Survey's results showed that there was high knowledge about standard precautions among study participants, but this knowledge did not translate into adherence to prevention measures. Likewise, the participants reported interest in attending training, which is a very positive aspect, although the percentage of participation was low in the institutional capacities offered. This reality refers to the need to rethink about them.

The individual groups and approaches provided an exchange of knowledge, orientation from the health team at the study site, a discussion of the issues addressed in the Survey, which presented relevant results, such as poor adherence to hand hygiene by the team, low adherence to the use of gloves in specific procedures, such as in the administration of subcutaneous medications, a deficit in the manipulation of containers for the disposal of sharp materials, and the non-exchange of these when reaching two-thirds of their capacity, according to the manufacturer, and other issues. There was unanimous agreement with the importance of the topic and the need to develop tools to help reduce hospital infections. They were cited to compose the bundle: orientation on the use and consequent adherence to Personal Protective Equipment (PPE), stimulation and promotion of hand hygiene, guidelines and greater adhesion/solicitation to the hygiene of materials and equipment for collective use. The need for permanent education actions, adequate to the reality of the place, was also highlighted.

The analysis of Survey's results, literature review and "Here-and-Now" groups, correlated, determined the prioritization of three care for hospital infection control in

an adult emergency service, described in 13 items, five of the first care, hand hygiene, six of the second care, related to the use of PPE, and two of the third care, which addresses the asepsis of materials and equipment. Their respective levels of evidence were also cited, according to **Table 1**.

Table 1 - Care for hospital-acquired infection control in adult emergency service and level of evidence, *HU-UFSC*, 2017.

Care	Care description for hospital-acquired infection control in an adult emergency department	Evidence level
Hand hygiene	Perform hand hygiene before contact with the patient; Perform hand hygiene before aseptic procedure; Perform hand hygiene after exposure to body fluids; Perform hand hygiene after contact with the patient; Perform hand hygiene after contact with areas close to the patient.	Level 4
Use of PPE	Wear uniform/closed shoes within adult emergency services; Use surgical masks in the care of patients in precaution by droplets; Use filter masks (N95/PFF2) to care for patients in an airborne precaution; Wear gloves in every contact with patient or between different procedures on the same patient and when handling objects or surfaces soiled with blood and/or liquids, for venipuncture and other procedures; Use apron whenever there is a risk of contact with biological materials (in situations of contact precaution should be placed only if there is direct contact with the patient); Wear protective goggles in procedures that generate blood splatters or secretions (liquids), thus avoiding exposure of the mucosa of the eyes.	Level 6
Asepsis of materials and equipment	Clean equipment such as ultrasound, stethoscope, cuff, thermometer, infusion pumps and countertops [,] before and after each use [,] with Incidin; Request hygienization of stretchers, armchairs and wheelchairs with soap and water after use.	Level 4

Source: The authors.

The items selected to compose the hospital emergency care control bundle in the adult emergency service were defined from the analysis of Survey's results, the literature review and the "Here-and-Now" groups, and will be discussed based on the literature.

1. Hand hygiene

Hand Hygiene (HH) is an essential procedure to contain the spread of microorganisms, an essential action to prevent hospital infection.[12]

This assertion in the literature was known to health professionals who participated in this study since 94.23% of them stated that hand washing should be realized during care. Nevertheless, the adherence to this care does not correspond to what the professionals did in their practice, since only 46.15% of the participants performed hand washing in the care interval among different patients, always 46.15% often.

Studies describe the importance of this measure and refer the hands of health professionals as one of the major sources of cross-infection in a hospital when they contact patients.[12,13]

Considering the importance of HH by health professionals, it is important to mention that these professionals may be great sources of cross-infection. In this bundle, hygiene care are defined in accordance to a study developed by the World Health Organization, which indicates that it should occur in five moments, listed below:[12]

- Before contact with the patient
- Before executing the aseptic procedure
- After exposure to body fluids
- After contact with the patient
- After contact with areas close to the patient

Herein, 98.08% of the professionals declared disinfecting their hands immediately after contact with biological materials, nonetheless, 71.15% performed this hygiene after removing the gloves. In addition to protection for patients, HH is an important measure also in the protection of health professionals.

Therefore, HH is such an important and effective measure that it must be encouraged. The literature emphasizes that, in order to obtain greater adherence of health professionals to this action, it is important that sinks and dispensers of alcoholic solutions are always available, facilitating their use, reducing the chances of forgetting, cited by health professionals as one of the causes of non-adherence to HH, since only 46.15% of the professionals in this study reported that disinfecting their hands when conducting the care in different patients.[14]

Regarding the use of products for hand hygiene, the literature states that the procedure should be executed with soap and water whenever they are visibly soiled, or alcoholic (liquid/gel) solutions may be used if not visibly soiled, for up to five times before using soap and water again.[15,16]

The use of an alcohol gel pocket is a strategy seen as efficient, especially in units such as emergency, which has the characteristic of unpredictability, making this solution accessible in any situation.[15]

2. Use of Personal Protective Equipment (PPE)

Similarly to hand hygiene, another essential factor in preventing the transmission of microorganisms is the use of Personal Protective Equipment (PPE) in the care of patients. EEP are devices that should be used when there is a risk of exposure to biological material and chemicals.[17]

Most PPE have low adherence. Among them, procedure gloves are the most used. 98.04% of the research participants reported that they use gloves when executing procedures with the risk of contact with urine or feces. On the other hand, only 52.94% reported using these gloves in the administration of intramuscular or subcutaneous medications. Glove use is recommended in all patient care.[18]

Others PPE have lower adherence, but they are also important in the prevention of hospital-acquired infection, having a great relevance in the environment protection, which the professional is dealing or manipulating, therefore, an important item in the constitution of this bundle.[19] However, the main objective of this equipment is protection for the health professional.

Protection masks were cited as "always" used by only 31.37% and "often" by 39.22% of the study participants. The use of filter masks to prevent the spread of transmissible respiratory diseases is recommended for health professionals in contact with persons under aerosol precautions, as it reduces the spread of respiratory diseases, and surgical masks should be used in droplet precautions.[20,21]

Aprons should be used to protect exposed areas of healthcare workers, as well as avoid contamination of clothing, serving as protection for health care professionals in procedures where blood, body fluid, secretion, or excretion are likely to occur, although, they were always used by only 19.61% of participants.[22,16]

The glasses should be used in procedures that involve the possibility of splashes and contact with blood, secretions and body fluids, presenting adhesion of only 13.73% in this study.[23,16]

It is important that health professionals know about the equipment and are qualified for their use, recognizing situations in which they are required, and care in handling, hygienization, and disposal according to their demands.[24] Because of misuse, these PPE may become objects of microorganism transmission.[18]

In the present research, when asked about the need to adopt standard precautionary measures, besides the droplets precautionary measures, 46 (88.46%) of the professionals answered "true" when assisting patients with active tuberculosis or varicella, demonstrating that there is a lack of knowledge about PPE, and that the correct care for patients with these diagnoses would include standard precautions and airborne precautions (which includes the use of N 95 filter masks).

Due to the risks and consequences of the dissemination of microorganisms, for both, the population that uses health services and professionals in the area, it is necessary to promote the orientation of these professionals, in particular, to raise awareness and encourage adherence and conscious use of the preventive and precautionary measures, aiming at reducing hospital infection rates.[25]

3. Asepsis of materials and equipment

Studies indicate that contamination is present in hospital equipment, such as: stethoscopes, sphygmomanometers, thermometers, wheelchairs, stretchers, infusion pumps, as well as contamination in the environment, such as telephones and countertops.[26-8]

Herein, all health professionals (100%) stated that they were aware that they should not touch objects and the environment with contaminated PPE. This result is especially important when it is related to studies such as those in Australia, which detected bacterial colonization in sphygmomanometer cuffs in the surgical center units, emergency department and Intensive Care Unit (ICU). Among those places, the emergency department presented the highest rate, with 100% of these materials colonized.[29] In Israel, it was identified contamination by several pathogenic bacteria in wheelchairs. Furthermore, it was noted that there are no specific protocols for dealing with the disinfection and frequency of wheelchair cleaning in hospitals.[30]

The results of this study, such as poor adherence to hand hygiene in the care of different patients and low adherence to glove use in certain procedures, and to contact patients, demonstrate the attitudes adopted by health professionals that favor environmental contamination.

In addition to the need for health team to join standard protective measures, materials, and equipment used in patient care require to be cleaned before and after use, and the solutions used should be those recommended by manufacturers.[28] Cleaning ultrasound equipment with germicide revealed effectiveness as well as wheelchairs.[27,30]

Protocols addressing cleaning and hygienization of those equipment and the environment contribute to the decrease of these sources of microorganism transmission and because it is one probable source of hospital infection.[30] At the institution of the study, these protocols were non-existent.

Irrefutably, another aspect pointed out by the participants as necessary for the containment of hospital-acquired infections is permanent education, which needs to be thought out and reinvented with the intention to reach employees in the emergency units. Considering that the institution under study has an active hospital infection control service and commission, which conducts annual programming with monthly training for teachers, students, and employees, it is essential to reflect on the reasons why it is not reaching almost 50% of the patients in this study.

CONCLUSIONS

The care bundle for the prevention and control of hospital-acquired infection in an adult emergency service, based on the contribution of the health professionals who participated in this study, who represent approximately 50% of the total number of employees working in the emergency studied, incorporated three categories of care: Hand Hygiene, Use of Personal Protective Equipment (EPP) and Asepsis of materials and equipment.

This care, collectively developed in a convergent care research, in which we sought to establish viable and effective care, and its evidence demonstrated with the aid of an integrative literature review, has the primary purpose of contributing to the prevention and control of hospital infection in this environment.

It was concluded with the Survey that there was a high knowledge of the professionals regarding precautions, but low adherence to them. The literature review showed that the measures proposed and tested in these services presented positive results for the control of multidrug-resistant bacteria, including continuing education for professionals, encouragement of hand hygiene and use of PPE, screening of patients, sanitary surveillance culture, isolation of patients in a cohort and efficient hygiene of the environment and equipment. Nonetheless, those measures showed positive results when conducted together, which reinforce the relevance of the construction of a care bundle. The "Here-and-Now" groups provided exchange of knowledge, experiences and discussion on the subject, as well as suggestions for the composition of the bundle, which included items related to continuing education, the use of PPE, hygienization of materials and equipment for collective use and team incentive.

The option for this bundle of care, encompassing three care, as pointed out in the literature review, and it is the most effective form of positive results in the control of hospital infection, having been constructed with data collected in the adult emergency unit with the assistance of its health professionals, demonstrating the deficits of this place and seeking improvements taking into account their specific characteristics. It can effectively contribute to improving habits and remind the health team about the need to adhere to attitudes that qualify care to the patient, offering safety to the patient and the health team.

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Corresponding author
Sabrina da Silva de Souza
Address: Rua Elizeu di Bernardi, 200, Campinas
Santa Catarina, Brazil
Zip code: 88.101-050
E-mail address: enfermeirasabrina@gmail.com
Telephone number: +55 (48) 99982-0686

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