




ORIGINAL


Early identification and initial treatment of sepsis by emergency nurses

Identificação precoce e tratamento inicial da sepse por enfermeiros da emergência
Identificación precoz y tratamiento inicial de la sepsis por enfermeros de la emergencia


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ABSTRACT

Objective: To identify the knowledge of nurses working in the emergency sector about the identification and initial treatment of sepsis. **Methods:** Descriptive, cross-sectional, quantitative study, developed in the emergency room of a public hospital in Roraima, with 25 nurses. Sociodemographic, occupational and nurses' knowledge of sepsis data were collected by applying a structured online form using Google Forms and analyzed using descriptive statistics employing the Statistical Package for the Social Sciences (SPSS) version 20.0. **Results:** Among the participants, 76.0% reported not having received training on sepsis and not having knowledge about the existence of sepsis protocols in the institution. As for the specific questions about sepsis, 68.0% had outdated knowledge about the current definition and clinical signs of sepsis. The initial management of sepsis, the ideal time to administer the first dose of the antibiotic and start a broad-spectrum antibiotic, were the questions that obtained the best percentages of correct answers, with 88.0% and 80.0%, respectively. **Conclusion:** It was found that there are gaps in the knowledge of emergency nurses on the identification and early treatment of sepsis, justifying the urgent need for training and implementation of clinical protocols on the subject in the institution.

Descriptors: Emergency Identification. Sepsis. Nurses. Patient Care Planning. Emergencies.

RESUMO

Objetivo: Identificar o conhecimento dos enfermeiros atuantes no setor de emergência sobre a identificação e tratamento inicial da sepse. **Métodos:** Estudo descritivo, transversal, quantitativo, desenvolvido na emergência de um hospital público de Roraima, com 25 enfermeiros. Os dados sociodemográficos, ocupacionais e de conhecimento dos enfermeiros sobre sepse foram coletados por meio de um formulário estruturado *online* através do *Google Forms* e analisados utilizando-se estatística descritiva por meio do programa *Statistical Package for the Social Sciences* (SPSS) versão 20.0. **Resultados:** Dentre os participantes, 76,0% relataram não terem recebido treinamento sobre sepse e não possuírem conhecimento sobre a existência de protocolos de sepse na instituição. Quanto às questões específicas sobre sepse, 68,0% apresentaram conhecimento desatualizado sobre a definição atual e os sinais clínicos da sepse. O manejo inicial de sepse, tempo ideal para administrar a primeira dose do antibiótico e iniciar antibiótico de amplo espectro, foram as questões que obtiveram melhores percentuais de acerto, com 88,0% e 80,0%, respectivamente. **Conclusão:** Verificou-se que há lacunas no conhecimento dos enfermeiros da emergência sobre a identificação e o tratamento precoce da sepse, justificando a necessidade urgente de realização de capacitações e implantação de protocolos clínicos sobre o tema na instituição.

Descritores: Identificação da Emergência. Sepse. Enfermeiras e Enfermeiros. Planejamento de Assistência ao Paciente. Emergências.

RESUMÉN

Objetivo: Identificar el conocimiento de los enfermeros que actúan en el sector de emergencia sobre la identificación y tratamiento inicial de la sepsis. **Métodos:** Estudio descriptivo, transversal, cuantitativo, desarrollado en la emergencia de un hospital público de Roraima, con 25 enfermeros. Los datos sociodemográficos, ocupacionales y del conocimiento de los profesionales sobre la sepsis se recopilaron mediante un formulario online estructurado en *Google Forms* y se analizaron mediante estadísticas descriptivas utilizando el Paquete Estadístico para las Ciencias Sociales, versión 20.0. **Resultados:** El 76,0% refirió no haber recibido capacitación sobre sepsis y no tener conocimiento sobre la existencia de protocolos de sepsis en la institución. Sobre las preguntas específicas, el 68,0% tenía conocimiento desactualizado sobre la definición actual y los signos clínicos de sepsis. El manejo inicial de la sepsis, el momento ideal para administrar la primera dosis del antibiótico e iniciar un antibiótico de amplio espectro, fueron las preguntas que obtuvieron los mejores porcentajes de respuestas correctas, con 88,0% y 80,0%, respectivamente. **Conclusión:** Se constató que existen lagunas en el conocimiento de los enfermeros de emergencia sobre identificación y tratamiento precoz de la sepsis, lo que justifica la urgente necesidad de capacitación e implementación de protocolos clínicos en la institución.

Descritores: Identificación de la Emergencia. Sepsis. Enfermeras y Enfermeros. Planificación de Atención al Paciente. Urgencias Médicas.

INTRODUCTION

Since 2016, sepsis has been defined as the Potentially Fatal Organ Dysfunction Syndrome, caused by a dysregulated response of the body to an infection that culminates in septic shock, the most severe version of sepsis, accompanied by circulatory, metabolic and cellular abnormalities, which can lead to death.⁽¹⁾ Sepsis annually affects approximately 30 million people worldwide and is responsible for global mortality of approximately 30.0% to 40.0%, exceeding 50.0% in countries under development.⁽²⁾

In Brazil, mortality from sepsis and septic shock is high, especially in public and private hospitals, with a percentage of deaths of up to 44.2%. One of the main factors for the high mortality of sepsis in the country is the delay in diagnosis and in the beginning of treatment.⁽³⁾ Also in the hospital environment, studies indicate that 93.0% of patients develop sepsis outside the Intensive Care Unit (ICU) and 43.3% are admitted to the hospital with organ dysfunction indicative of sepsis.⁽⁴⁾

Therefore, it is necessary that the nurse, as a member of the multidisciplinary team and active in the emergency sector, be able to briefly identify the presumptive signs and symptoms of sepsis. As the professional closest to the patient during the entire period of hospitalization, the nurse can intervene effectively and accurately. In addition, the knowledge of this professional in the early identification of this condition can avoid a bad prognosis, promote timely treatment, increase the chances of patient survival, reduce hospitalization time and hospitalization costs, avoid the risk of comorbidities associated with organ dysfunction, which are factors directly related to the risk of mortality and to the suffering of patients and their families.⁽⁵⁻⁶⁾

It is also important to highlight that sepsis has an infectious origin, therefore, any infection can trigger it, whether caused by viruses, bacteria, protozoa or fungi, with bacteria being the main ones involved in these infections.⁽⁷⁾ Its clinical manifestations vary according to the degree of organ dysfunction. Therefore, the early diagnosis of sepsis is still a major challenge for health professionals, as the complexity of its clinical manifestations causes it to be confused with other diseases. However, the evaluation and constant surveillance of human responses, an intrinsic attribute of nursing, allows the continuous monitoring of signs and symptoms in an uninterrupted care process.⁽⁸⁾

Aiming to facilitate and speed up the process of identifying and treating this disease, the Society of Critical Care Medicine (SCCM) and the European Society of Critical Care Medicine (ESCCM) suggest the use of the quick Sequential Organ Failure Assessment Score (qSOFA), a tool for quick approach, at the bedside. The qSOFA is an ideal method to be used in the first attendance in emergency units, as it helps the early identification of patients with sepsis or with suspected sepsis.⁽⁹⁾

With regard to treatment, the Surviving Sepsis Campaign (SSC), of 2018, recommends the one-hour bundle, which should be instituted within the first few hours, as soon as the individual is identified with

Early identification and initial treatment of sepsis.. sepsis. Among the measures of this bundle, there are: i) lactate collection; ii) collection of blood cultures; iii) initiation of broad-spectrum antibiotic therapy; iv) volume replacement; v) use of vasopressors; vi) reassessment of blood volume and; vii) reassessment of lactate.⁽¹⁰⁾

In this perspective, the emergency unit stands out, characterized by being an open-door service, with a high demand for care and complex conditions inherent to the environment itself. Thus, the care dynamics established by nurses and other members of the multidisciplinary team need to be performed quickly, immediately, with agility, precision and efficiency, in order to identify sepsis and prevent possible aggravations.⁽¹¹⁻¹²⁾

As sepsis is a highly time-dependent disease and the first hospital contact of patients usually occurs in the emergency unit, the nurse, when identifying individuals with signs suggestive of sepsis, must inform the medical team so that the protocol and the goal-guided therapy can be initiated.⁽¹³⁾ However, in order for the measures recommended in the protocols to be effective, nurses need to be aware of this syndrome and the instruments for identifying and managing patients in septic conditions.⁽⁷⁾

Considering the relevance of this theme, the literature has been drawing attention to issues involving the qualification of health professionals in the context of sepsis. In this sense, studies that assess nurses' knowledge have demonstrated the need to update these professionals on the subject. These studies point to a high percentage (40.4%) of nurses who reported difficulty in assisting septic patients⁽¹⁴⁾, a low percentage (43.5%) of nurses able to correctly identify the clinical signs of sepsis and, also, nurses who stated that the topic was not sufficiently addressed in their undergraduate courses (65.2%).⁽¹⁵⁾

Given this context, the following question emerged: How is the knowledge of nurses working in emergency units about sepsis?

This questioning derived from the understanding of the impacts caused by this condition on the life of an individual and on the health system, and on the premise that these impacts can be minimized if sepsis is identified and treated early by the multidisciplinary health team. In this way, it is possible to reduce the number of deaths and offer safe and quality care. Thus, this study aimed to identify the knowledge of nurses working in the emergency department about early identification and initial treatment of sepsis.

METHODS

This is a descriptive, cross-sectional study with a quantitative approach, developed in the emergency department of a large public hospital in Roraima, Brazil. During the period of the research, the emergency sector had 25 nurses who worked in direct patient care and made up the six nursing teams distributed in the three work shifts (morning, afternoon and night). All these nurses (n=25) were included in the research.

Data collection took place by means of an online questionnaire, made available through a link,

applying a web form created using Google Forms and sent to nurses who worked in the hospital emergency, through a multiplatform instant messaging app (WhatsApp). Data collection was carried out in the period from May 14 to 28, 2020, time in which the form was available for responses on the platform.

Professionals were invited to participate in the survey, answering it at an appropriate time and according to their availability. The Free and Informed Consent Term was attached to the data collection form, in which only upon its acceptance, the survey questionnaire was made available. It is worth mentioning that the telephone numbers of the professionals were made available by the nursing coordination of the hospital's emergency sector, which also authorized the sharing of the survey link via WhatsApp groups and in individual (private) conversations.

The questionnaire applied to nurses was adapted from Goulart *et al.* (2019)⁽⁵⁾ and contained questions related to the knowledge of these professionals about early identification and the first interventions in the face of a suspected and/or confirmed case of sepsis, according to the International Consensus on Definitions for Sepsis-3⁽¹⁾ and in the SSC update.⁽¹⁰⁾

Therefore, the data collection instrument consisted of: a) questions regarding the sociodemographic and occupational data of the professionals, containing the following variables: gender, age, education level, time of nursing training, time of work in the emergency, training on sepsis and knowledge of the institution's existing sepsis protocol(s); b) multiple choice questions about theoretical knowledge about the initial measures of sepsis identification: definition of sepsis, clinical signs, qSOFA score and its components and; c) questions regarding the treatment of sepsis: ideal time for the administration of the first dose of antibiotic, tests that must be collected before the 1st dose of antibiotic and the first measures to be adopted when signs of sepsis are identified.

Data analysis was performed based on the 2016 International Consensus on Definitions for Sepsis-3 and the 2018 SSC update. For the analysis of early identification actions, responses related to qSOFA variables (Glasgow Coma Scale, Respiratory Rate and Systemic Blood Pressure). Interventions were analyzed based on the one-hour bundle (measure lactate level and remeasure if initial lactate is ≥ 2 mmol/L; collect blood samples for blood culture prior to administration of antibiotic therapy; administer broad-spectrum antibiotic and perform de-escalation; fluid resuscitation with 30mL/kg crystalloids for hypoperfusion or lactate ≥ 4 mmol/L; start vasopressor if the patient is hypotensive during or after fluid resuscitation to maintain MAP ≥ 65 mmHg).^(1,10)

The data were tabulated in electronic spreadsheets in the Microsoft® Excel program, and later, received statistical treatment using the Statistical Package for the Social Sciences (SPSS), version 20.0. Descriptive data analysis was performed using relative and absolute frequencies, as well as measures of central tendency (mean) and dispersion (standard deviation).

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For analysis purposes, questions with more than one correct alternative were categorized as "YES" for correct alternatives, and "NO" for incorrect ones, and thus were calculated and analyzed individually. Finally, this study was part of an institutional investigative project approved by the Research Ethics Committee involving human beings at the Universidade Federal de Roraima, approved under opinion n° 5,226,868.

As it is a research in virtual environment, the informed consent was previously presented and all nurses agreed to participate in the research. Consent was considered when the questionnaire was answered and sent for evaluation (Circular Letter No. 1/2021-CONEP/SECNS/MS, item 2.5).

RESULTS

All nurses who worked in the emergency unit during the analyzed period participated in the study (100.0%; n=25), the majority being female (64.0%; n=16), with a mean age of 37, 8 \pm 6.3 years. It was observed that 12 nurses (48.0%) had between six and ten years of training, 12 (48.0%) worked in the emergency department for five to ten years, 19 (76.0%) said they had never received training on sepsis and the same percentage (76.0%; n=19) stated that they were not aware of the existence of sepsis protocols in the institution. The nurses' profile and general aspects of sepsis protocol and training are presented in Table 1.

The analysis of the answers obtained on the definition, clinical signs, patient assessment tool (qSOFA) and initial management of sepsis by nurses in the emergency unit showed that 68.0% (n=17) of these professionals were unaware of the current definition of sepsis, as established by the Sepsis-3 consensus. Most participants (76.0%; n=19) stated that they did not know the patient assessment tool for sepsis (qSOFA). Regarding the initial measures after the recognition of sepsis, 80.0% (n=20) of the nurses correctly answered the alternative "administer the first dose of a broad-spectrum antibiotic". Table 2 presents the questions applied to nurses and their respective relative and absolute frequencies.

Table 1. Profile of nurses participating in the study and general aspects of sepsis protocol and training. Boa Vista, Roraima, Brazil, n=25.

Variable	n	%
Gender		
Female	16	64.0
Male	9	36.0
Age		
20 to 29 years	1	4.0
30 to 39 years	14	56.0
40 to 49 years	8	32.0
Education level		
Specialist	21	84.0
Graduated	4	16.0
Time of nursing training		
0 to 5 years	3	12.0
5 to 10 years	12	48.0
More than 10 years	10	40.0
Time working in the emergency sector		
0 to 5 years	10	40.0
5 to 10 years	12	48.0
Training on sepsis		
No	19	76.0
Yes	6	24.0
Knowledge of the institution's existing sepsis protocol(s)		
No	19	76.0
Yes	6	24.0
Mean age (years) and standard deviation	37,9 (±6,3)	

Source: authors (2022).

Table 2. Distribution of responses obtained on the definition of sepsis, early identification and initial treatment of it by nurses from an emergency unit. Boa Vista, Roraima, Brazil, 2022, n=25.

Variable	n	%
Knowledge		
1) Definition of sepsis		
Generalized infection	17	68.0
Presence of life-threatening organ dysfunction secondary to the body's dysregulated response to infection*	8	32.0
Suspected or confirmed infection without organ dysfunction	0	0.0
Suspected or confirmed infection, without organ dysfunction, regardless of the presence of signs of SIRS	0	0.0
2) Clinical signs of sepsis		
Oliguria, hyperthermia > 38.3°C, hypotension and dyspnea	12	48.0
Decreased level of consciousness, hypotension, hyperlactatemia, and tachypnea ≥ 22 bpm*	8	32.0
Hyperemia, hyperthermia > 38.3°C, hypotension and oliguria	3	12.0
Significant increase in bilirubin, hypolactatemia, consciousness level alteration, and hypotension	2	8.0
3) Knowledge of qSOFA		
No	19	76.0
Yes	6	24.0
4) qSOFA variables/components**		
GCS <15, RR ≥ 22 ipm and SBP < 100 mmHg*	5	83.6

SBP < 90mmHg, metabolic acidosis and hyperbilirubinemia	1	16.6
Lowered level of consciousness, oliguria and azotemia	0	0.0
Initial management of sepsis		
5) Initiate broad-spectrum antibiotic		
Yes	20	80.0
No	5	20.0
6) Measure lactate level and measure again if starting value is elevated (> 2 mmol/L)		
Yes	4	16.0
No	21	84.0
7) Aggressive and early fluid replacement in patients with hypoperfusion or lactate twice the reference value (≥ 4 mmol/L)		
Yes	7	28.0
No	18	72.0
8) Use of vasopressor (during or after volume infusion) to maintain mean arterial pressure ≤ 65 mmHg		
Yes	3	12.0
No	22	88.0
Total	25	100.0

Source: authors (2022).

*correct alternative; **percentage calculated based on the number of nurses who answered yes to the previous question; SIRS: Systemic Inflammatory Response Syndrome; GCS: Glasgow Coma Scale; RR: Respiratory Rate; SBP: Systolic Blood Pressure.

DISCUSSION

Nurses' knowledge about sepsis was below what was necessary, demonstrating outdatedness on the subject, especially in aspects related to the current definition of sepsis (Sepsis-3) and the patient assessment tool (qSOFA). The fragility of the health institution in the continuing education of these professionals was also observed, demonstrated by the small number of participants who claimed to know the institutional protocol and to have received training on the topic addressed in this study. This data highlights the urgent need to implement a sepsis protocol and continuing education to scientifically support the institution's multidisciplinary team in the identification, treatment and clinical management of the person with this condition.⁽¹⁶⁻¹⁷⁾

In this sense, it is essential to highlight that the institution assumes the role of co-responsibility in the training of professionals, using strategies anchored in the National Policy on Permanent Education in Health, as a means of qualifying the multidisciplinary health team in relation to the identification of signs and symptoms of sepsis, thus ensuring higher patient survival rates.⁽¹⁸⁾

It is important to highlight that the training actions should be carried out periodically, since the admission of the professional, with feedback for continuous improvement and enhancement of the results, and that there should also be more investment in the development of protocols to standardize care and adapt the treatment of patients.^(16,19) Without educational support, nurses, in the long term, tend to be outdated on new guidelines, protocols and definitions, according to research carried out at national and international levels.^(16,20)

A study carried out with 412 patients revealed improvements in the ability to early identify sepsis, in addition to a reduction in the number of deaths after implementation of the protocol. There were significant improvements in relation to the recommended time for starting antibiotic therapy, performing lactate collection and blood culture.⁽²¹⁾

Another study, also carried out with nurses in the emergency department, showed that after some educational interventions there was a reduction in the average time for administration of antibiotics and a reduction in general mortality from sepsis by 5.9%.⁽²⁰⁾ This demonstrates that continuing education can be a great ally in care, encouraging health professionals to transform the reality in which they are inserted and institute safe care based on scientific evidence.⁽²²⁾

According to the international consensus (Sepsis-3) of 2016, sepsis can be classified as the presence of life-threatening organ dysfunction secondary to the body's dysregulated response to infection.⁽¹⁾ However, more than half of the nurses in this study are unaware of this new definition and classification.

The difficulty in the applicability of the concepts of sepsis by health professionals directly implies the worsening of the prognosis and in the evolution of the clinical condition of the patients, since this contributes to the delay in the identification and early diagnosis.⁽¹⁴⁾ The recognition of changes in the Septic condition is the first step towards correct action and management, being directly associated with the patient's chances of cure.⁽²³⁾ The identification of the patient with suspected sepsis can be performed by the nurse or by another professional of the health team.⁽¹⁴⁾

Once identified, the medical team must be called and they will decide whether or not to continue the sepsis protocol. Thus, it is necessary that the entire multidisciplinary team has full knowledge of the process of early identification of signs and symptoms of sepsis in order to provide immediate, safe and quality care for patients.⁽¹⁸⁾

With regard to initial treatment, broad-spectrum antibiotics should be administered within one hour of the diagnosis of sepsis, an average time considered as the window of opportunity capable of reducing mortality from sepsis and septic shock by approximately 16%.^(10,24) This is an indispensable and crucial measure in the treatment of septic patients, and it should be started immediately, right after the adequate collection of the culture. If it is not possible to collect this test before the first dose, the

administration of antimicrobials should be prioritized.⁽³⁾

Although the prescriptions for antibiotic therapy, volume resuscitation and the infusion of vasoactive drugs are not the nurse's duties, knowledge of these indications is essential for monitoring the septic patient for preventive action, identifying and communicating the main changes to the doctor in a timely manner, managing supplies and medications, among others.⁽²³⁾

In view of this issue, it is worth emphasizing that nursing, as it is with the patient daily, has an essential role in monitoring and constantly evaluating them through physical examination, especially of vital parameters, included in the qSOFA tool, in addition to the analysis of laboratory tests. Nursing professionals, once trained, can quickly identify changes in the patient's clinical condition caused by sepsis.

Therefore, any and all changes must be identified, reported and recorded by nursing, since it is from the monitoring of these specific standards that the nurse, through the nursing process, will be able to prepare a care plan, with a view to meeting the real and potential needs of each individual. Here, nursing interventions should focus on the implementation of specific care in order to optimize the treatment and prevention of complications, in addition to improving the clinical outcome and the quality of care and ensuring patient safety.⁽¹⁷⁾

It is considered as limitations of this study the use of a self-administered online questionnaire, which made it impossible to know the circumstances in which it was answered. Despite this limitation, we sought to provide a general and current view of the knowledge of nurses in the emergency sector about sepsis. On the other hand, the online survey provided greater security, practicality and convenience to study participants and also made it possible to include a greater number of nurses in the survey.

It is important to mention that the scarcity of studies in the North region, mainly in Roraima, compromises the understanding of the aspects that involve the care of septic patients in a region with its own characteristics and different from other regions of Brazil. Roraima is a new state, located in the extreme north of the country, in the Amazon region, and characterized by its relative geographic isolation. In the context of hospital services, it is observed that they have been undergoing a process of restructuring and reorganization demanded by some factors, among them, the change in population dynamics that occurred over the last few years.

In the field of education, the offer of higher education courses in the area of health is relatively recent, especially the offer of postgraduate courses (*lato and stricto sensu*). Therefore, the need for qualified health professionals is a frequent and continuous demand and their establishment in the region is still a great challenge to be faced. These aspects may be related to the fragility observed in the results of this study.

Thus, the contributions of this study permeate the possibility of instituting measures that expand knowledge and guarantee skills for nurses working in the emergency sector on this theme. Also, that this

Early identification and initial treatment of sepsis.. study can contribute to draw attention, not only of nurses, but of the entire multi-professional team, to the importance of implementing protocols, carrying out conducts based on scientific evidence, in addition to pointing to the need for permanent and continuous education measures, with a view to the professional improvement of the entire team involved in patient care at risk of sepsis.

CONCLUSION

Based on the results of this study, it can be inferred that nurses' knowledge about the identification and early treatment of sepsis is outdated, especially with regard to the new definition and guidelines for the care of patients with sepsis. This finding is worrying, as nurses in the emergency sector are at the forefront of care and defense against sepsis, through early recognition and knowledge of current and evidence-based therapeutic management.

Thus, considering the performance obtained by nurses in the questionnaire applied in this study, it is evident the fragility of knowledge about the initial measures of treatment in the general context and the indication of the need for permanent education actions. It is recommended the promotion of educational actions, such as training and/or proper qualification on the subject for nurses, as well as the adoption of clinical protocols for sepsis in the institution.

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