








# EPIDEMIOLOGICAL AND CLINICAL PROFILE OF PATIENTS WITH SUSPECTED SEPSIS AND SEPTIC SHOCK IN A HOSPITAL EMERGENCY

## PERFIL EPIDEMIOLÓGICO E CLÍNICO DE PACIENTES COM SUSPEITA DE SEPSE E CHOQUE SÉPTICO EM EMERGÊNCIA HOSPITALAR

## PERFIL EPIDEMIOLÓGICO Y CLÍNICO DE PACIENTES CON SOSPECHA DE SEPSIS Y CHOQUE SEPTICO EN URGENCIA HOSPITALARIA

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### ABSTRACT

Objective: to analyze clinical and demographic characteristics and compliance with the 'Surviving Sepsis Campaign' in suspected or confirmed cases of sepsis and septic shock recorded in medical records of a hospital emergency. Method: quantitative, descriptive study. The sample consisted of 127 medical records of adult patients admitted to a hospital emergency from June to October 2019. For data analysis, frequencies, mean, standard deviation, chi-square test and Kruskal-Wallis test were used. Results: the cases of sepsis and septic shock had the pulmonary as their main focus. The predominant clinical diagnosis was infection with organ dysfunction. The predominant clinical outcome was hospital discharge. The performance of measures recommended by the Sepsis Survival Campaign in the first hour after the suspected diagnosis - collection of lactate, administration of antibiotics and collection of blood cultures - was recorded in 10 (7.9%) medical records. Conclusion: knowledge of the epidemiological characteristics of suspected or confirmed cases of sepsis and septic shock showed that the clinical practice of the professionals involved was not in accordance with the conduct recommended by the Surviving Sepsis Campaign.

Keywords: Nursing; Emergency Service; Hospital; Sepsis; Shock; Septic; Patient Care.

### RESUMO

Objetivo: analisar características clínicas, demográficas e conformidade com a "Campanha Sobrevivendo à Sepsis" nos casos suspeitos ou confirmados de sepse e choque séptico registrados em prontuários de uma emergência hospitalar. Método: estudo quantitativo, descritivo. A amostra foi composta de 127 prontuários de pacientes adultos internados em emergência hospitalar no período de junho a outubro de 2019. Para análise dos dados, utilizaram-se frequências, média, desvio-padrão, teste qui-quadrado e teste de Kruskal-Wallis. Resultados: os casos de sepse e choque séptico tiveram como principal foco o pulmonar. O diagnóstico clínico predominante foi infecção com disfunção orgânica. O desfecho clínico predominante foi a alta hospitalar. A realização das medidas recomendadas pela Campanha de Sobrevivência à Sepse na primeira hora após a suspeita diagnóstica - coleta de lactato, administração de antibióticos e coleta de hemoculturas - foi registrada em 10 (7,9%) prontuários. Conclusão: o conhecimento das características epidemiológicas dos casos de sepse e choque séptico suspeitos ou confirmados demonstrou que a prática clínica dos profissionais envolvidos não estava em conformidade com as condutas preconizadas pela Campanha Sobrevivendo à Sepse.

Palavras-Chave: Enfermagem; Serviço Hospitalar de Emergência; Sepse; Choque Séptico; Assistência ao Paciente.

### RESUMEN

Objetivo: analizar las características clínicas, demográficas y el cumplimiento de la "Campaña Sobreviviendo a la Sepsis" en casos sospechosos o confirmados de sepsis y choque séptico registrados en la historia clínica de una emergencia hospitalaria. Método: estudio descriptivo cuantitativo. La muestra estuvo conformada por 127 historias clínicas de pacientes adultos ingresados en una emergencia hospitalaria de junio a octubre de 2019. Para el análisis de los datos se utilizaron frecuencias, media, desviación estándar, prueba de chi-cuadrado y prueba de Kruskal-Wallis. Resultados: los casos de sepsis y choque séptico tuvieron al pulmonar como foco principal. El diagnóstico clínico predominante fue infección con disfunción orgánica. El resultado clínico predominante fue el alta hospitalaria. La realización de las medidas recomendadas por la Campaña Sobreviviendo a la Sepsis en la primera hora posterior al diagnóstico de sospecha - recolección de lactato, administración de antibióticos y recolección de hemocultivos - se registró en 10 (7,9%) historias clínicas. Conclusión: el conocimiento de las características epidemiológicas de los casos sospechosos o confirmados de sepsis y choque séptico mostró que la práctica clínica de los profesionales involucrados no se ajusta a la conducta recomendada por la Campaña Sobreviviendo a la Sepsis.

Palabras clave: Enfermería; Servicio de Urgencia en Hospital; Sepsis; Choque Séptico; Atención al Paciente.

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## INTRODUCTION

Sepsis is a multifactorial syndrome defined by life-threatening organic dysfunction, due to a dysregulated immune response to infection.<sup>1</sup> The temporal evolution of the syndrome to a more severe clinical picture characterizes septic shock, in which there is a worsening of circulatory, cellular, and metabolic pattern, leading to multiple organ failure and high risk of death.<sup>2</sup>

In Brazil, it is estimated that 680,000 deaths from sepsis occur per year, affecting mostly patients admitted to hospital emergency and emergency services.<sup>3</sup> In these places, lethality rates in public institutions reach 43% and in private institutions at 17%.<sup>4</sup> The high mortality rates are related to several risk factors that increase the susceptibility to infections, such as: population aging,<sup>5</sup> high-risk procedures, bacterial resistance, immunosuppression, prolonged use of invasive devices and chronic diseases such as diabetes Mellitus and systemic arterial hypertension.<sup>6</sup>

Since its conception, the Surviving Sepsis Campaign (SSC) has worked to reduce the morbidity and mortality of the syndrome, worldwide, through the formulation of guidelines that help professionals to identify and conduct treatment in septic patients early, in order to obtain better results in the prognosis of patients affected by the syndrome. These recommendations for practical improvements from the SSC were called the 1-hour package, which currently consists of: measuring the lactate level, obtaining cultures before starting antibiotics, administering broad-spectrum antibiotics, intravenous fluid, and vasopressors.<sup>7,8</sup>

Health teams unprepared to identify cases of sepsis or septic shock and the consequent delay quickly and correctly in starting treatment are factors that contribute to the poor prognosis of patients.<sup>7</sup> The clinical conduct of professionals in the face of suspected or confirmed cases of the syndrome must consider three fundamental points: early identification with severity stratification, prevention of organ dysfunction and treatment of the cause with control of the infectious focus.<sup>8</sup>

Interdisciplinary strategies that allow early identification of patients with suspected sepsis make it difficult to progress to severe stages of the syndrome. A study<sup>9</sup> that characterized clinical aspects, severity and mortality of septic patients treated in an emergency room at a tertiary hospital revealed that there is a significant demand for these cases, mainly from secondary and primary services. In this scenario, Nursing has a fundamental role in the identification of signs

and symptoms, especially those related to infections and organic dysfunction criteria.<sup>9</sup>

In this meander, the importance of this study is justified given the impact of the syndrome on public health, with a potential risk of death, and the absence of epidemiological and clinical data regarding the care of septic patients in the institution where the research took place. Thus, knowing the clinical data of emergency units can help in the recognition of sepsis cases and favor early interventions, essential for reducing mortality in these scenarios. Thus, the question that guided this study was: what are the clinical and demographic characteristics of patients with a suspected or confirmed diagnosis of sepsis in a hospital emergency and what is their compliance with the guidelines of the Surviving Sepsis Campaign?

## MAIN OBJECTIVE

Evaluate the epidemiological and clinical profile of patients with suspected sepsis and septic shock in an emergency hospital.

## SPECIFIC OBJECTIVES

Characterize the population of patients with suspected sepsis and septic shock.

Describe the clinical practices of the Nursing and medical staff, as recommended by the Surviving Sepsis Campaign, in the 1-hour package, in relation to the execution time.

## METHOD

Quantitative, descriptive study carried out in the adult emergency department of a public hospital in southern Brazil, reported according to the STROBE tool.<sup>10</sup> Data collection was carried out by the researcher in the months of June to October 2019, in the morning and afternoon, at different times. The study took place in the Adult Emergency Unit, which has a reception with risk classification carried out by full-time nurses. All clinical cases are classified, while surgical cases occur on demand. The unit does not have a specific care protocol for detecting sepsis.

In 2019, there were 8,843 clinical and 4,226 surgical consultations, with a monthly average of 4,400 consultations at the study site. However, the institution does not have data on the number of patients with sepsis and/or septic shock treated in the emergency unit.

Sample calculation was performed using the SEstat-Net® Web Statistics Teaching-Learning System.<sup>11</sup> The sample was non-probabilistic. To estimate characteristics whose expected frequency in the population was 50%, considering a confidence index of 95% and a margin of error of 10 percentage points, 97 medical records were needed. The study population included 142 medical records of patients with a suspected or confirmed diagnosis of sepsis or septic shock who were assisted in the unit during the period of data collection.

Inclusion criteria were medical records of patients over 18 years of age, of both genders, admitted to the adult emergency unit with a suspected or confirmed diagnosis of sepsis or septic shock. Medical records of patients in palliative care or in contact isolation were excluded. Based on the aforementioned criteria, 10 records of patients who were in palliative care and five of patients in contact isolation were excluded. Thus, the final sample consisted of 127 patient records.

The factors that determined the suspicion of sepsis followed the recommendations of the guidelines of the Latin American Institute of Sepsis (ILAS):<sup>4</sup> present suspected or confirmed infection, combined with two or more signs of systemic inflammatory response syndrome (SIRS) - hyperthermia  $>37.8^{\circ}\text{C}$  or hypothermia  $<35^{\circ}\text{C}$ ; leukocytosis  $>12,000/\text{mm}^3$ , leukopenia  $<4,000/\text{mm}^3$  or turning to the left  $>10\%$  of young forms; tachycardia  $>90\text{ bpm}$ ; tachypnea  $>20\text{ rpm}$ ; and/or one or more organ dysfunctions: oliguria, hypotension, dyspnea or desaturation or lowered level of consciousness.

The patients were identified through a daily check of the records carried out within 24 hours by the medical and Nursing staff, in the physical record (attendance sheets, vital signs and Nursing evolution sheets) and in the electronic medical record. To identify patients with suspected sepsis or septic shock, the following were sought: main complaint, reason for seeking care reported by patients, and information recorded by nurses and physicians during initial care. Patients with suspected or confirmed infection associated with two or more SIRS criteria and/or one or more organ dysfunctions were considered to have a suspected clinical picture of sepsis.

Patients participating in the research were followed up by checking medical records and daily census, from the moment of admission to the emergency unit until the clinical outcome, during the period of data collection. Data were recorded in a collection instrument designed

for this study, including the variables present in the reception form for patients admitted to emergencies, as suggested by ILAS. The variables are shown in Figure 1.

To organize the data, Excel® software version 16.37 was used. To represent the categorical variables (gender, comorbidity, focus, previous hospitalization, outcome, laboratory tests and vital signs) absolute and relative frequencies were used. Initially, the variables were analyzed as a whole, without differentiation by diagnosis, then broken down into diagnostic groups: suspected sepsis, sepsis, septic shock, and infection.

The chi-square test was used to compare the proportions of the categorical variable gender between the four groups of diagnoses (suspected sepsis, sepsis, septic shock, infection). With the exception of the discrete variable age, represented by mean and standard deviation, the continuous variables emergence stay and hospital stay were represented by the median and interquartile range (median [p25; p75]).

Because the number of participants in the classification groups was less than 12 patients (septic shock group: four patients; and suspected unconfirmed sepsis: seven patients), the distributions of these variables were compared using the Kruskal-Wallis test; when significant, the comparison was performed by the pair-by-pair (post-hoc) Dunn test. All analyzes were performed using SPSS software v.25.

The study was approved by the Ethics Committee for Research with Human Beings of the Universidade Federal de Santa Catarina and the ethical principles and postulates were observed, under registration number CAAE: 06897819.4.0000.0121, Opinion Report No. 3.369.139. All patients or their responsible family members signed an Informed Consent Form (ICF).

## RESULTS

Data are presented in their totality, as well as differentiating those suspected of sepsis, sepsis, septic shock, or infection. The characteristics of the patients are shown in Table 1.

In the characterization of patients (Table 1), there was a predominance of females (55.1%). The mean age of participants was 62 years ( $SD=19.9$ ). Most, 101 (63%), of the patients had been hospitalized in the last 60 days. The previous prevalent comorbidity was arterial hypertension - 58 (45.7%). The main infectious focus was the pulmonary - 61 (48%). The cases of infection with organic dysfunction were more expressive, 97 (76.4%). Of the patients diagnosed with sepsis - 19 (15%) -, four (21%)

Figure 1 - Demographic variables related to hospitalization, clinical practice, medical and Nursing staff and related to clinical practices recommended in the 1-hour package of the Surviving Sepsis Campaign, in relation to execution time

| Demographic Variables   |  |        |
|---|--|--------|
| Gender  | Female or male   |        |
| Age   | In years   |        |
| Variables related to hospital admission   |  |        |
| Diagnostic  | Suspected sepsis, sepsis, septic shock, infection  |        |
| Comorbidity   | Previous comorbidity report: hypertension, diabetes Mellitus, chronic obstructive pulmonary disease, congestive heart failure, immunosuppression, neuromuscular disease, chronic renal failure, no comorbidities, stroke |        |
| Previous hospitalization  | In days  |        |
| Focus   | Pulmonary, urinary, abdominal, others  |        |
| Emergency time  | In days  |        |
| Hospital time   | In days  |        |
| Outcome   | Discharge, death, transfer, evasion  |        |
| Variables related to the clinical practice of the medical team, according to the guidelines of the Sepsis Survival Campaign |  |        |
| Gasometry with lactate  | Request for blood gas collection with lactate  |        |
| Blood culture   | Request for blood culture collection   |        |
| Laboratory tests  | Request for complete blood count, C-reactive protein, creatinine, bilirubin  |        |
| Antibiotic prescription   | ( ) YES  | ( ) NO |
| Crystalloid prescription  | ( ) YES  | ( ) NO |
| Prescription of vasoactive drugs  | ( ) YES  | ( ) NO |
| Use of mechanical ventilation   | ( ) YES  | ( ) NO |
| Transfer to intensive care unit   | ( ) YES  | ( ) NO |
| Variables related to the clinical practice of the Nursing team, according to the guidelines of the Sepsis Survival Campaign |  |        |
| Blood gas collection with lactate   | Collection of blood gases with lactate, as prescribed médica<br>( ) YES ( ) NO   |        |
| Administer antibiotic   | Administration of the prescribed antibiotic<br>( ) YES ( ) NO  |        |
| Administer crystalloids   | Prescribed crystalloid administration<br>( ) YES ( ) NO  |        |
| Administer vasoactive drugs   | Administration of prescribed vasoactive drugs<br>( ) YES ( ) NO  |        |
| Check vital signs   | Checking vital signs<br>( ) YES ( ) NO   |        |
| Variables related to best clinical practices in the 1-hour Surviving Sepsis Campaign package, in relation to execution time |  |        |
| Blood gas collection with lactate   | Period described in hours, elapsed for the collection of gasometry with lactate, after the septic condition  |        |
| Blood culture collection  | Period described in hours, elapsed for the collection of blood cultures, after the septic condition  |        |
| Antibiotic administration   | Period described in hours, elapsed for the administration of the first dose of antibiotic after the septic condition   |        |
| Crystalloid administration  | Period described in hours, elapsed for the administration of crystalloids after the septic condition   |        |
| Administration of vasoactive drugs  | Period described in hours, elapsed for the administration of vasoactive drugs after the septic condition   |        |

clinically progressed to septic shock. Of these four, two were discharged from the hospital and two died. Of the septic patients - 19 (15%), 13 (68.4%) were discharged and six (31.6%) died.

Four (3.1%) patients were admitted to the institution with septic shock, requiring admission to the ICU (75%). All patients initially diagnosed with septic shock (100%) died.

Table 1 - Distribution of patients according to the variables: gender, age, comorbidity, previous hospitalization, focus, emergency room stay, hospital stay, and outcome (n=127). Santa Catarina, Brazil, 2019

|                             |                        | TOTAL<br>(n=127)<br>n (%)          | Sepsis suspect<br>(n=7)<br>n (%) | Sepsis<br>(n=19)<br>n (%)       | Septic shock<br>(n=4)<br>n (%) | Infection<br>(n=97)<br>n (%)      | p value |
|-----------------------------|------------------------|------------------------------------|----------------------------------|---------------------------------|--------------------------------|-----------------------------------|---------|
| Gender <sup>1</sup>         | Female                 | 70 (55.1)                          | 3 (42.9)                         | 11 (57.9)                       | 1 (25)                         | 55 (56.7)                         | 0.603   |
|                             | Male                   | 57 (44.9)                          | 4 (57.1)                         | 8 (42.1)                        | 3 (75)                         | 42 (43.3)                         |         |
| Age <sup>2</sup>            | mean (SD)              | 62.0 (19.9)                        | 53.1 (23.1)                      | 64.1 (19.8)                     | 57.5 (19.9)                    | 62.5 (19.8)                       |         |
|                             | min-max                | 19.4 - 97.1                        | 29.0 - 90.1                      | 19.4 - 89.2                     | 31.9 - 79.1                    | 22.0 - 97.1                       | 0.627   |
| Comorbidity                 | SAH                    | 58 (45.7)                          | 3 (42.9)                         | 7 (36.8)                        | 1 (25)                         | 47 (48.5)                         |         |
|                             | DM                     | 46 (36.2)                          | 2 (28.6)                         | 9 (47.4)                        | 0 (0)                          | 35 (36.1)                         |         |
|                             | COPD                   | 24 (18.9)                          | 2 (28.6)                         | 3 (15.8)                        | 1 (25)                         | 18 (18.6)                         |         |
|                             | CHF                    | 12 (9.4)                           | 0 (0)                            | 3 (15.8)                        | 0 (0)                          | 9 (9.3)                           |         |
|                             |                        | Sepsis suspect<br>(n=127)<br>n (%) | Sepsis<br>(n=7)<br>n (%)         | Septic shock<br>(n=19)<br>n (%) | Infection<br>(n=4)<br>n (%)    | Sepsis suspect<br>(n=97)<br>n (%) | p value |
|                             | Immunosuppression      | 25 (19.6)                          | 1 (14.3)                         | 4 (21.1)                        | 3 (75)                         | 17 (17.6)                         |         |
|                             | Neuromuscular diseases | 12 (9.4)                           | 0 (0)                            | 1 (5.3)                         | 1 (25)                         | 10 (10.3)                         |         |
|                             | CRF                    | 11 (8.7)                           | 5 (71.4)                         | 2 (10.5)                        | 0 (0)                          | 4 (4.1)                           |         |
|                             | No comorbidities       | 10 (7.9)                           | 0 (0)                            | 2 (10.5)                        | 0 (0)                          | 8 (8.2)                           |         |
|                             | CVA                    | 9 (7.1)                            | 1 (14.3)                         | 3 (15.8)                        | 0 (0)                          | 5 (5.2)                           |         |
| Previous hospitalization    | Last 60 days           | 101 (63)                           | 2 (1.9)                          | 16 (84)                         | 4 (100)                        | 79 (81)                           |         |
| Focus                       | Pulmonary              | 61 (48)                            | 3 (42.9)                         | 9 (47.4)                        | 1 (25)                         | 48 (49.5)                         |         |
|                             | Urinary                | 38 (29.9)                          | 3 (42.9)                         | 8 (42.1)                        | 2 (50)                         | 25 (25.8)                         |         |
|                             | Abdominal              | 21 (16.5)                          | 1 (14.3)                         | 2 (10.5)                        | 1 (25)                         | 17 (17.5)                         |         |
|                             | *Others                | 10 (7.9)                           | 1 (14.3)                         | 1 (5.3)                         | 0 (0)                          | 8 (8.2)                           |         |
| Emergency stay <sup>3</sup> | median [p25; p75]      | 4 [2; 7]                           | 2ab [1; 7]                       | 3ab [1; 7]                      | 1a [0.34; 1.75]                | 4b [3; 7]                         | 0.006   |
|                             | min - max              | 0.1; 18                            | 1.0; 7                           | 0.1; 10                         | 0.1; 2                         | 1.0; 18                           |         |
| Hospital stay <sup>3</sup>  | median [p25; p75]      | 6 [3; 10]                          | 3ab [1; 7]                       | 7b [3; 10]                      | 1.5a [1; 2]                    | 6b [4; 10]                        | 0.004   |
|                             | min - max              | 1; 25                              | 1; 7                             | 1; 20                           | 1; 2                           | 1; 25                             |         |
| Outcome                     | Discharge              | 102 (80.3)                         | 6 (85.7)                         | 13 (68.4)                       | 0 (0)                          | 83 (85.6)                         |         |
|                             | Death                  | 19 (15)                            | 1 (14.3)                         | 6 (31.6)                        | 4 (100)                        | 8 (8.2)                           |         |
|                             | Transfer               | 5 (3.9)                            |                                  |                                 |                                | 5 (5.2)                           |         |
|                             | Evasion                | 1 (0.8)                            |                                  |                                 |                                | 1 (1)                             |         |

SAH: systemic arterial hypertension; DM: diabetes Mellitus; COPD: chronic obstructive pulmonary disease; CHF: congestive heart failure; CRF: chronic renal failure; CVA: cerebrovascular accident. \*Cardiac, bone/articular, skin, or soft tissue. Results analyzed by <sup>1</sup>chi-square test, <sup>2</sup>mean±standard deviation (SD), <sup>3</sup>Kruskal-Wallis test. Distinct letters represent statistically different distributions.

With regard to the attributions of the medical team (Table 2), the request for all laboratory tests indicated by the SSC guidelines for adequate therapy occurred in 10 (7.9%) medical records. In another 10 (7.9%) medical records there were no records of requests for laboratory tests. Antibiotic therapy was present in 119 (93.7%) charts, crystalloids in 40 (31.7%) and vasoactive drugs in nine (7.1%) charts. The use of invasive mechanical ventilation was required in six (4.7%) patients.

Regarding the care provided to the patient by the Nursing team, although requested in a medical prescription, not all measures taken were registered in the medical records. The prescribed antibiotic was administered to 117 (98.3%) patients. Crystalloids were administered to 39 (97.5%) patients. The recording of the measurement of all vital signs verified during the first visit to the patient was described in 77 (60.6%) medical records, as described in Table 2.

Concerning the performance of all initial measures, in the first hour after the suspected diagnosis, recommended by the SSC - collection of lactate, administration of antibiotics and collection of blood cultures -, there were records in 10 (7.9%) medical records.

The zero time for the 1-hour package starts with the emergency department's triage or, if referenced from another care unit, from the earliest record in the medical record of the suspicion of sepsis or septic shock.<sup>12</sup> The time in which the measures were performed are described in Table 3.

Table 2 - Distribution of variables related to the clinical practice of the Nursing and medical team, as recommended by the Surviving Sepsis Campaign (n=127). Santa Catarina, Brazil, 2019

| Variables                        | TOTAL<br>(n=127)<br>n (%) | Sepsis suspect<br>(n=7)<br>n (%) | Sepsis<br>(n=19)<br>n (%) | Septic shock<br>(n=4)<br>n (%) | Infection<br>(n=97)<br>n (%) |
|----------------------------------|---------------------------|----------------------------------|---------------------------|--------------------------------|------------------------------|
| Medicine                         |                           |                                  |                           |                                |                              |
| Gasometry with lactate           | 59 (46.5)                 | 3 (42.9)                         | 16 (84.2)                 | 4 (100)                        | 37 (38.1)                    |
| Blood culture                    | 50 (39.4)                 | 3 (42.9)                         | 17 (89.5)                 | 2 (50)                         | 28 (28.9)                    |
| Complete blood count             | 113 (89)                  | 4 (57.1)                         | 17 (89.5)                 | 4 (100)                        | 88 (90.7)                    |
| C-reactive protein               | 104 (81.9)                | 4 (57.1)                         | 16 (84.2)                 | 3 (75)                         | 81 (83.5)                    |
| Creatinine                       | 104 (81.9)                | 3 (42.9)                         | 17 (89.5)                 | 3 (75)                         | 81 (83.5)                    |
| Bilirubin                        | 37 (29.1)                 | 1 (14.3)                         | 7 (36.8)                  | 2 (50)                         | 27 (27.8)                    |
| Antibiotic prescription          | 119 (93.7)                | 7 (100)                          | 19 (100)                  | 4 (100)                        | 89 (91.8)                    |
| Crystalloid prescription         | 40 (31.7)                 | 2 (28.6)                         | 14 (73.7)                 | 3 (75)                         | 21 (21.9)                    |
| Prescription of vasoactive drugs | 9 (7.1)                   | 0 (0)                            | 5 (26.3)                  | 3 (75)                         | 1 (1)                        |
| Use of mechanical ventilation    | 6 (4.7)                   | 0 (0)                            | 2 (10.5)                  | 2 (50)                         | 2 (2.1)                      |
| Transfer to intensive care unit  | 9 (7.1)                   | 1 (11.1)                         | 4 (44.4)                  | 3 (33.3)                       | 1 (11.1)                     |
| Nursing                          |                           |                                  |                           |                                |                              |
| Collect blood gas with lactate   | 59 (100)                  | 3 (100)                          | 15 (93.8)                 | 4 (100)                        | 37 (38.1)                    |
| Administer antibiotic            | 117 (98.3)                | 6 (85.7)                         | 19 (100)                  | 4 (100)                        | 88 (98.9)                    |
| Administer crystalloids          | 39 (97.5)                 | 2 (100)                          | 13 (92.9)                 | 3 (100)                        | 20 (95.2)                    |
| Administer vasoactive drugs      | 9 (100)                   | 0 (0)                            | 5 (100)                   | 3 (100)                        | 1 (100)                      |
| Check vital signs                | 77 (60.6)                 | 4 (5.1)                          | 10 (12.9)                 | 3 (3.8)                        | 60 (77.9)                    |

Table 3 - Distribution of recommended clinical practices in the 1-hour package of the Surviving Sepsis Campaign, in relation to execution time (n=127). Santa Catarina, Brazil, 2019

| Variables                                    | Duration   | Total<br>n (%) | Sepsis suspect<br>n (%) | Sepsis<br>n (%) | Septic shock<br>n (%) | Infection<br>n (%) |
|--|------------|----------------|-------------------------|-----------------|-----------------------|--------------------|
| Blood gas collection with lactate<br>(n=57)  | Up to 1h   | 18 (31.6)      | 0 (0)                   | 5 (33.3)        | 1 (25)                | 12 (34.3)          |
|  | 1h to 3h   | 25 (43.9)      | 1 (33.3)                | 6 (40)          | 2 (50)                | 16 (45.7)          |
|  | 3h to 6h   | 7 (12.3)       | 1 (33.3)                | 2 (13.3)        | 0 (0)                 | 4 (11.4)           |
|  | 6h or more | 7 (12.3)       | 1 (33.3)                | 2 (13.3)        | 1 (25)                | 3 (8.6)            |
| Blood culture collection (n=50)              | até 1h     | 10 (20)        | 1 (25)                  | 3 (15.7)        | 1 (25)                | 5 (5.1)            |
|  | 1h to 3h   | 15 (30)        | 1 (25)                  | 6 (31.6)        | 1 (25)                | 6 (6.1)            |
|  | 3h to 6h   | 20 (40)        | 1 (25)                  | 3 (15.8)        | 0 (0)                 | 17 (17.5)          |
|  | 6h or more | 5 (10)         | 0 (0)                   | 5 (26.3)        | 0 (0)                 | 0 (0)              |
| Antibiotic administration (n=117)            | Up to 1h   | 25 (21.4)      | 2 (33.3)                | 5 (26.3)        | 2 (50)                | 16 (18.2)          |
|  | 1h to 3h   | 34 (29.1)      | 0 (0)                   | 7 (36.8)        | 2 (50)                | 25 (28.4)          |
|  | 3h to 6h   | 27 (23.1)      | 3 (50)                  | 4 (21.1)        | 0 (0)                 | 20 (22.7)          |
|  | 6h ou mais | 31 (26.5)      | 1 (16.7)                | 3 (15.8)        | 0 (0)                 | 27 (30.7)          |
| Crystalloid administration (n=38)            | Up to 1h   | 17 (44.7)      | 1 (14.2)                | 4 (30.8)        | 4 (100)               | 8 (42.1)           |
|  | 1h to 3h   | 11 (28.9)      | 1 (14.2)                | 6 (46.2)        | 0 (0)                 | 4 (21.1)           |
|  | 3h to 6h   | 6 (15.8)       | 0 (0)                   | 2 (15.4)        | 0 (0)                 | 4 (21.1)           |
|  | 6h or more | 4 (10.5)       | 0 (0)                   | 1 (7.7)         | 0 (0)                 | 3 (15.8)           |
| Administration of vasoactive drugs<br>(n=10) | Up to 1h   | 4 (40)         | 0 (0)                   | 1 (16.7)        | 2 (66.7)              | 1 (1)              |
|  | 1h to 3h   | 1 (10)         | 0 (0)                   | 0 (0)           | 1 (33.3)              | 0 (0)              |
|  | 3h to 6h   | 2 (20)         | 0 (0)                   | 2 (33.3)        | 0 (0)                 | 0 (0)              |
|  | 6h or more | 3 (30)         | 0 (0)                   | 3 (50)          | 0 (0)                 | 0 (0)              |



## DISCUSSION

In the results obtained from the medical records included in the sample, it was possible to identify records of sepsis and/or septic shock. In this study, elderly patients with multiple comorbidities and who had been hospitalized in the previous 60 days constituted the largest proportion of patients admitted with suspected sepsis.

In this sense, a study<sup>13</sup> that investigated the predictors of mortality in emergency patients with sepsis reported more mortality in people over 70 years of age. It is known that chronic diseases, such as high blood pressure and diabetes Mellitus, in the face of a vulnerable immune system favor the development of diseases<sup>14</sup> and favor the risk of septic conditions, due to previous exposure to multi-resistant pathogens.<sup>15</sup>

This study identified the predominance of infections related, respectively, to pulmonary, urinary, and abdominal foci. Despite this, pneumonia and urinary tract infection have great potential for aggravating sepsis, and it is necessary to identify the infectious site within the first six hours after diagnosis, so that the appropriate therapy is directed in a timely manner.<sup>15-16</sup>

The literature asserts that the suspicion of sepsis should occur in patients with a presumed or evident infectious focus, combined with two or more SIRS criteria and/or any organic dysfunction such as hypotension, altered level of consciousness and hyperlactatemia.<sup>4</sup> That said, it is valid to say that in this study, although all patients included had diagnostic criteria to be considered with suspicion of septic condition, most were initially diagnosed as infection with organ dysfunction.

As for the early identification of sepsis, the professionals of the Nursing and medical team stand out in the face of the hemodynamic changes presented by the patient.<sup>14</sup> The literature points to an important gap in the clinical practice of professionals for this skill combined with situations of difficult identification due to symptoms nonspecific, such as viral, bacterial, or other non-infectious processes, which delay its recognition.<sup>17</sup>

Regarding the implementation of the interventions recommended by the SSC that guide the clinical practice of professionals, a small number of patients who received all the recommended actions in the first hour of care was identified (collection of blood gases with lactate, administration of broad-spectrum antibiotics, collection of blood cultures).

It was also found that the measures performed as recommended occurred in a greater proportion in patients with a confirmed diagnosis of sepsis and septic shock, which may indicate the difficulty of professionals in managing patients with a presumptive condition of sepsis.

A research<sup>18</sup> that analyzed data from patients with sepsis and septic shock assisted according to the institutional protocol in the same context concluded that the delay in interventions within the recommended time, especially the absence of antibiotic administration in the first hour, was directly related to clinical worsening patient and hospital mortality rates.

In light of the above, on suspicion of sepsis, the medical team will determine whether or not intervention measures should be initiated. And if the protocol is followed, interventions must be carried out within the first hour after diagnosis.<sup>4</sup> Among the medical duties are requesting the collection of blood gases with lactate and blood cultures, prescribing antibiotic therapy, requesting the administration of crystalloids and vasopressors if hypotension refractory to volume replacement, requesting transfusion of blood products and, finally, transferring the patient to the intensive care unit (ICU).<sup>12</sup>

Research has shown that the joint performance of interventions recommended by the SSC positively affects the patient's prognosis.<sup>12</sup> In this sense, the early administration of broad-spectrum antibiotics should occur as soon as there is suspicion of sepsis, in addition to the use of combined antimicrobial therapy, via intravenous, after collection of blood cultures, in order to catch different microorganisms.<sup>19,20</sup> The serum lactate dosage has clinical importance as it is considered a biomarker of organ dysfunction. Results above normal parameters ( $>2$  mmol/L) may indicate tissue hypoperfusion, due to activation of anaerobic metabolism. In sepsis, hyperlactatemia is associated with high mortality rates.<sup>12,20</sup>

Fluid resuscitation through the administration of crystalloids should be performed in the face of hypotension or hyperlactatemia, however, due to vascular hyporesponsiveness, fluid resuscitation may not be sufficient to reestablish tissue perfusion.<sup>1</sup> New evidence suggests better patient outcomes with the use of balanced crystalloids compared to saline solution in sepsis, and albumin can be beneficial in septic shock.<sup>21</sup> In case of hypotension refractory to fluid replacement, administration of vasopressors should be started, in order to maintain mean arterial pressure (MAP) at a level above 65 mmHg, with norepinephrine being the first choice vasopressor for the management of sepsis-related hypotension.<sup>1,20</sup>

Based on this context, nurses must be equipped with skills to be able to recognize warning signs and notify the medical professional quickly.<sup>21</sup> The nurse, as the leader of the Nursing team, has the role of ensuring that the necessary interventions occur in time skillful, such as, for example: activating the laboratory team in order to prioritize the collection of laboratory tests; administer the prescribed antibiotic, after blood culture collection, puncture large-caliber venous access for volume replacement; start early administration of vasoactive drugs. It is worth noting that the nurse is responsible for collecting blood for arterial blood gases, privately.<sup>19</sup>

A review study that investigated Nursing interventions in the identification, prevention, and control of sepsis in critically ill patients highlighted the importance of nurses in acquiring specialized skills to respond to the needs of patients with sepsis, which will translate into improved results and gains in health. Evidence has shown that nurses are essential in the early identification, control, and prevention of sepsis, preventing the progression of the disease to septic shock, contributing to the reduction of morbidity and mortality.<sup>19</sup>

In this study, it was observed that Nursing practices related to the verification of vital signs in the initial care of the patient were not described in all medical records but present in most of them. As they are physiological biomarkers, the measurement of these data allows the early identification of hemodynamic changes, such as hypoperfusion, characteristic of the septic condition, in which there is a decrease in the level of consciousness, hypotension, low urinary output and desaturation.<sup>22</sup>

Research<sup>5</sup> carried out in American hospitals concluded that, on average, 10% of deaths associated with sepsis could be avoided if there were no delays in diagnosis and errors in treatment. The study identified 42 errors in 36 deaths considered by researchers as potentially preventable. Among the results, aspects related to the clinical practice of professionals demonstrate greater susceptibility to failure, such as: choosing the wrong antibiotic; diagnosis delay; delay in starting antibiotic therapy; inadequate monitoring of vital signs, among other findings.

Regarding the length of hospital stay, in this study there was no significant difference between the hospitalization period of patients diagnosed with sepsis and those with infection with organ dysfunction. Patients with septic shock showed a significant reduction in the length of stay compared to others due to the severity of patients with septic shock.<sup>7</sup>

This research showed a reduced number of patients diagnosed with septic shock identified at hospital admission. It was possible to confirm this diagnosis in some of them from the worsening of the clinical picture during hospitalization. Although they represent a low percentage, the majority needed a place in the ICU and progressed to death. The literature confirms that critical patients need more intensive care, requiring transfer to the ICU bed. As a result, they are more exposed to invasive procedures, increasing the risk of complications from the clinical picture and death.<sup>23</sup>

As for the clinical outcome, there was a predominance of hospital discharge, however, the literature supports the need for hospital readmission for this population. A study involving 2,617 patients who survived sepsis showed that almost half of the patients needed to be hospitalized within 90 days after discharge. The main causes of readmission were infections of pulmonary and urinary focus, congestive heart failure, chronic obstructive pulmonary disease, and renal failure.<sup>24</sup> In another publication,<sup>2</sup> complications and death ranged from 16 to 30% of sepsis survivors in the first year after hospital discharge due to the deterioration of the functional status after sepsis, aggravated by age and by exacerbation of previous comorbidities.

A national study led by nurses found that it is essential to assess the quality of life of patients who survive sepsis after hospital discharge, certifying that the treatment was adequate and efficient, consequently reducing the damage caused by this disease, which directly influence the health condition of each individual.<sup>25</sup>

Finally, and considering the severity of the syndrome, the SSC and ILAS recommend that health institutions invest in quality improvement programs, implement management protocols for suspected cases of sepsis, train professionals in the early identification of signs and symptoms of the syndrome, in order to positively interfere in the patients' prognosis and provide evidence-based care.<sup>4,7</sup>

This study has as a limitation the fact that it was carried out in a single hospital urgency and emergency unit, in addition to the fact that it does not have a single electronic record system. Thus, further research on sepsis in emergency units is suggested, as these correspond to the main places of admission of septic patients and where there is more prevalence of studies on sepsis in the ICU.



## CONCLUSION

Knowledge of the clinical and epidemiological characteristics of suspected or confirmed cases of sepsis and septic shock treated in a hospital emergency demonstrated that the clinical practice of professionals involved in the care of septic patients was not in accordance with the conduct recommended by the SSC. The actions recommended in the 1-hour package were not fully performed in part of the appointments, if analyzed from the records. When described in the medical records, these were performed in a longer time than recommended. It was found that, although the SSC guidelines guide that the necessary interventions occur from the suspicion of septic condition, in this study such actions occurred in a greater proportion in patients with a confirmed diagnosis of sepsis or septic shock.

The results revealed the contribution to clinical practice by exploring approaches adopted for the treatment of septic patients performed by physicians and Nursing staff in hospital emergency units. Identifying and implementing care packages related to sepsis cases in line with the global initiative - Surviving Sepsis Campaign - directly impact the quality of life of the population seeking care in hospital emergency units.

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