

# PREVALENT NURSING DIAGNOSIS IN PATIENTS HOSPITALIZED WITH SEPSIS AT THE INTENSIVE CARE UNIT

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**ABSTRACT:** The objective in this study was to identify the prevalent nursing diagnoses in patients hospitalized with sepsis, severe sepsis or septic shock at an Intensive Care Unit. The population consisted of patients over 18 years of age, hospitalized at the Intensive Care Unit between January and December 2010. The information was collected from the patient histories, according to the sociodemographic and clinical characteristics and nursing diagnoses registered. In the study period, 103 patients were hospitalized, 79.4% of whom died. The following nursing diagnoses were identified: risk for infection, risk for aspiration, risk for impaired skin integrity, impaired spontaneous ventilation, impaired gas exchange, ineffective cardiopulmonary tissue perfusion and impaired skin integrity. In conclusion, the identification of the diagnoses present in the histories of sepsis patients is expected to contribute to nursing care for these clients.

**DESCRIPTORS:** Sepsis; Nursing diagnosis; Intensive care units.

## DIAGNÓSTICOS DE ENFERMAGEM PREVALENTES NO PACIENTE INTERNADO COM SEPSE NO CENTRO DE TERAPIA INTENSIVA

**RESUMO:** O objetivo deste estudo foi identificar os diagnósticos de enfermagem prevalentes nos pacientes internados com sepse, sepse grave ou choque séptico em um Centro de Terapia Intensiva. A população foi constituída pelos pacientes com idade superior a 18 anos, internados no Centro de Terapia Intensiva, de janeiro a dezembro de 2010. As informações foram coletadas do prontuário, de acordo com as características sociodemográficas e clínicas e diagnósticos de enfermagem registrados. No período estudado, foram internados 103 pacientes, sendo que 79,4% foram a óbito. Os diagnósticos de enfermagem identificados foram: risco de infecção, risco de aspiração, risco para integridade da pele prejudicada, ventilação espontânea prejudicada, troca de gases prejudicada, perfusão tissular ineficaz cardiopulmonar e integridade da pele prejudicada. Em conclusão, espera-se que a identificação dos diagnósticos, presentes nos prontuários de pacientes com sepse, possam contribuir para a assistência de enfermagem a essa clientela.

**DESCRIPTORES:** Sepse; Diagnóstico de enfermagem; Unidades de Terapia Intensiva.

## DIAGNÓSTICOS DE ENFERMERÍA PREVALENTES EN PACIENTE INTERNADO CON SEPSIS EN CENTRO DE TERAPIA INTENSIVA

**RESUMEN:** El objetivo de este estudio fue identificar los diagnósticos de enfermería prevalentes en los pacientes internados con sepsis, sepsis grave o choque séptico en un Centro de Terapia Intensiva. La población fue constituida por los pacientes con edad superior a 18 años, internados en el Centro de Terapia Intensiva, de enero a diciembre de 2010. Las informaciones fueron obtenidas del prontuario, de acuerdo con las características sociodemográficas y clínicas, así como diagnósticos de enfermería registrados. En el periodo estudiado, fueron internados 103 pacientes, siendo que 79,4% fueron a óbito. Los diagnósticos de enfermería identificados fueron: riesgo de infección, riesgo de aspiración, riesgo para integridad de la piel perjudicada, ventilación espontánea perjudicada, cambio de gases perjudicado, perfusión tisular ineficaz cardiopulmonar y integridad de la piel perjudicada. Se concluye que es necesario que la identificación de los diagnósticos, presentes en los prontuarios de pacientes con sepsis, pueda contribuir para la asistencia de enfermería a esa clientela.

**DESCRIPTORES:** Sepsis; Diagnóstico de enfermería; Unidades de Terapia Intensiva.

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**Received:** 11/06/2013

**Finalized:** 10/10/2014

## INTRODUCTION

Sepsis represents a great challenge for health professionals working at Intensive Care Units (ICU). This disease is known for its aggressiveness and starts with an infection, followed by the progressive functional loss of different organs<sup>(1)</sup>.

The initial response of the immune system to the invading microorganisms is called systemic inflammatory response syndrome (SIRS). The presence of an infectious agent is the main trigger of SIRS, but there may be non-infectious causes, including burns, traumas and surgeries. When SIRS is associated with a suspected or confirmed infection, it is called sepsis<sup>(2)</sup>. Severe sepsis corresponds to sepsis associated with organ dysfunction, hypotension and tissue hypoperfusion. Septic shock is characterized by persistent hypotension that does not improve after volume replacement, demanding the administration of vasoactive drugs to maintain the blood pressure at levels compatible with life<sup>(2,3)</sup>.

In Brazil, the Brazilian Sepsis Epidemiology Study (BASES) analyzed 1,387 patients admitted to ICUs in hospitals in different regions of the country. Out of 884 patients who were hospitalized for more than 24 hours, 88.8% complied with the diagnostic criterion for SIRS, 46.9% for sepsis, 27.3% for severe sepsis and 23% for septic shock. The mortality rate of patients with sepsis, severe sepsis and septic shock corresponded to 16.7%, 34.4% and 65.3%, respectively<sup>(4)</sup>.

The nursing professionals who work at ICU have daily contact with patients diagnosed with sepsis. As these professionals remain at the bedside, they should be apt to identify the signs and symptoms of sepsis and plan nursing care according to the patient's care needs. In that context, nursing recycling and training are compulsory when the goal is to guarantee the improvement of nursing care.

The Nursing Care Systemization (NCS) organizes the method, staff and equipment of professional nursing, permitting the operation of the nursing process. This methodological tool guides professional nursing care and the registering of professional practice<sup>(5)</sup>.

The Nursing Process (NP) as the underlying base of the NCS, consists of phases or steps that involve the data collection, the definition

of the Nursing Diagnoses (ND), planning, implementation of the nursing interventions and assessment of the outcomes, through an approach that is focused on problem solving and on setting targets to reach the best outcomes possible<sup>(6)</sup>.

For ICU patients, given the unstable situation and the need for more complex nursing care, systemized nursing care is needed, which will facilitated the established mastery of the technique, conciliating it with humanized and holistic care. The larger the number of client needs that are affected, the greater the need to plan care, as the systemization of actions aims for the organization, efficiency and validity of care delivery<sup>(7-8)</sup>.

One of the ways to get to know these patients' needs is to identify the prevalent NDs in these clients, so that the best nursing interventions can be promoted for the expected outcomes. Therefore, the objective in this study was to identify the prevalent NDs in the patients hospitalized at the ICU of a large hospital, diagnosed with sepsis, severe sepsis or septic shock, and to verify the pertinence of the diagnoses, according to the clinical characteristics of these clinical entities.

## MATERIALS AND METHODS

The quantitative methodological approach was adopted to develop this cross-sectional and retrospective study. The study was developed at a public tertiary hospital in the interior of the State of São Paulo, Brazil, whose general ICU consists of nine beds. The population consisted of patients over 18 years of age, hospitalized at the ICU and who developed sepsis, severe sepsis or septic shock, between January and December 2010. The files of patients coming from the obstetrics and emergency services and whose histories did not include NDs were excluded.

At the study hospital, the nursing process is used routinely in care for ICU patients. The NDs were elaborated in accordance with the taxonomy of the North American Nursing Diagnosis Association (NANDA) 2007-2008<sup>(9)</sup>. Although the NDs were elaborated based on the edition NANDA 2007-2008<sup>(9)</sup>, the discussion of this research was based on NANDA 2009-2011<sup>(10)</sup>.

The information collected from the patient histories were grouped according to the

sociodemographic and clinical variables (sex, age, Braden score, length of hospitalization at ICU, length of hospitalization, probable infection focus that triggered the sepsis, presence of diagnosis of sepsis, severe sepsis or septic shock and NDs registered by the nurse in charge when the patient was admitted to the ICU). The data were analyzed descriptively, using the software Microsoft Office Excel 2007 to calculate the frequencies, means and medians of the research variables. The results are presented as absolute figures and percentages in tables.

This research was elaborated in compliance with the guidelines of CNS Resolution 196/96 for research involving human beings and approval was obtained from the Research Ethics Committee of the University of São Paulo at Ribeirão Preto College of Nursing (Protocol 1423/2011), being exempted from the application of the Free and Informed Consent Form.

## RESULTS

Between January and December 2010, 103 patients diagnosed with sepsis, severe sepsis or septic shock and who complied with the inclusion criteria were hospitalized at the ICU of the study

hospital. In the total group of patients, 55 (53.4%) were male, between 18 and 86 years of age, with a median age of 58 years old. Of all patients diagnosed, 81 (78.6%) passed away. In the group that died, 45 were male (55.6%), between 19 and 86 years of age and a median age of 58 years old; and 36 were female (44.4%), between 18 and 85 years old and with a mean age of 58 years old.

The distribution of the sepsis, severe sepsis and septic shock diagnoses and the patients' mortality are described in Table 1.

Table 2 shows the distribution of the infection foci that probably triggered the sepsis, among which the pulmonary focus was predominant. Among the 103 patients assessed, 39 had no diagnosis of sepsis, severe sepsis and septic shock with an explicit definition of the focus, which had to be clarified.

The patients' score on the Braden Scale upon hospitalization at the ICU ranged between 7 and 20, with a median score of 11. In 11 files, the patient's Braden score was not indicated on the ICU hospitalization form. The length of hospitalization at the ICU ranged between 1 and 62 days, with a median 6 days. The length of the hospital stay until death ranged between 1 and

Table 1 - Distribution of sepsis, severe sepsis and septic shock diagnoses and respective mortality rates. Ribeirão Preto, SP, Brazil, 2013

Medical diagnosis	Diagnosis – n (%)	Mortality – N (%)
Sepsis	23 (22,3)	15 (18,5)
Severe sepsis	17 (16,5)	11 (13,6)
Septic shock	63 (61,2)	55 (67,9)
Total	103 (100)	81 (100)

184 days, with a median 6 days, while the length of hospitalization until discharge ranged between 4 and 71 days, with a median 14.5 days.

The nurses only identified the NDs on the first day of hospitalization at the ICU, without daily reassessment. For the 103 patients, 298 NDs were documented in seven different diagnostic categories and some repeated diagnoses in the assessment of the various patients.

According to the prevalence, the following diagnoses were identified: risk for infection, risk for aspiration, risk for impaired tissue integrity, impaired spontaneous ventilation, impaired gas exchange, ineffective cardiopulmonary tissue perfusion, impaired skin integrity. The prevalence

of the diagnoses according to their domains is displayed in Table 3. In Figure 2, the NDs and their related factors are shown, while Figure 2 contains the NDs and their defining characteristics. The percentage of ND refers to how frequently each ND was identified in the study population. The percentages of related factors and defining characteristics refer to the frequency of the respective ND.

Table 2 - Distribution of infection foci. Ribeirão Preto, SP, Brazil, 2013

Infection focus	n	%
Pulmonary	37	35,9
Abdominal	08	7,8
Urinary	06	5,8
Central venous catheter	05	4,9
Cardiac	02	1,9
Cutaneous	02	1,9
Renal	02	1,9
Fournier Syndrome	01	1,1
To be clarified	40	38,8
Total	103	100

Table 3 - Frequency of ND identified at the ICU, described according to the NANDA-I taxonomy. Ribeirão Preto, SP, Brazil, 2013

Domain and Nursing Diagnosis	n (%)
<b>Safety/protection</b>	
Risk for infection	93 (31,2)
Risk for aspiration	79 (26,5)
Risk for impaired skin integrity	75 (25,2)
Impaired skin integrity	06 (2)
<b>Activity and rest</b>	
Impaired spontaneous ventilation	25 (8,4)
Ineffective cardiopulmonary tissue perfusion	09 (3)
<b>Elimination and exchange</b>	
Impaired gas exchange	11 (3,7)
<b>Total</b>	298 (100)

Figure 1 - Frequency of factors related to the identified NDs, described according to NANDA-I. Ribeirão Preto, SP, Brazil, 2013

Nursing Diagnosis, N (%)	Fatores Relacionados n (%)
Risk for infection, 93 (90.3)	Immunosuppression, 29 (31.1); Invasive procedures, 83 (89.2); Chronic diseases, 48 (51.6); Inadequate primary and secondary defenses, 41 (44.1)
Risk for aspiration, 79 (76.7)	Tracheostomy, 64 (81.0); Reduced level of consciousness, 53 (67); Impaired swallowing, 22 (27.8); Tube feeding, 34 (43)
Risk for impaired skin integrity, 75 (72.8)	Imbalanced nutritional state, 31 (41.3); Physical immobilization, 49 (65.3); Moisture, 13 (17.3); Mechanical factors, 60 (80)
Impaired spontaneous ventilation, 25 (24.3)	Respiratory muscle fatigue, 18 (72); Metabolic factors, 09 (36)
Impaired gas exchange, 11 (10.7)	Ventilation-perfusion imbalance, 10 (90.9); Alveolar-capillary membrane changes, 05 (45.5%)
Ineffective cardiopulmonary tissue perfusion, 09 (8.7)	Decompensation between ventilation and blood flow, 06 (66,7); Impaired O <sub>2</sub> transportation, 05 (55,6); Hyper or hypovolemia, 04 (44,4)
Impaired skin integrity, 06 (58)	Mechanical factors, 06 (100); Moisture, 02 (33.3); Physical immobilization, 04 (66.7); Imbalanced nutritional state, 05 (83.3)

Figure 2 - Frequency of defining characteristics of identified NDs, described according to NANDA-I. Ribeirão Preto, SP, Brasil, 2013

Nursing Diagnosis, N (%)	Defining Characteristics, N (%)
Risk for infection, 93 (90.3)	Does not apply
Risk for aspiration, 79 (76.7)	Does not apply
Risk for impaired skin integrity, 75 (72.8)	Does not apply
Impaired spontaneous ventilation, 25 (24.3)	Restlessness, 10 (40); Dyspnea, 14 (56); Decreased O <sub>2</sub> saturation, 13 (52); Increased use of accessory muscles, 13 (52)
Impaired gas exchange, 11 (10.7)	Tachypnea/dyspnea, 07 (63.6); Abnormal arterial blood gases, 06 (54.5); Hypoxemia / hypoxia, 03 (27.3); Abnormal breathing (rhythm, depth), 05 (45.5)
Ineffective cardiopulmonary tissue perfusion, 09 (8.7)	Arrhythmias, 03 (33.3); Chest pain, 03 (33.3); Bronchospasm, 02 (22.2); Abnormal arterial blood gases, 03 (33.3)
Impaired skin integrity, 06 (5.8)	Destruction of skin layers, 01 (16.7); Disruption of skin surface, 03 (50)

## DISCUSSION

This study identified the prevalent NDs in patients hospitalized with a diagnosis of sepsis, severe sepsis and septic shock, at the ICU of a large hospital, and can be a tool to identify these clients' care needs.

Although the NDs were elaborated based on NANDA 2007-2008<sup>(9)</sup>, the discussion was based on NANDA 2009-2011<sup>(10)</sup>. The prevalent ND was risk for infection, which was related to immunosuppression, invasive procedures, chronic illnesses and inadequate primary and secondary defenses. This finding indicates a possible lack of understanding on the definition of sepsis and on the NDs, as the patients with this diagnosis had been diagnosed with sepsis, severe sepsis or septic shock, i.e., the infection was already established and no longer a risk. On the other hand, some diagnoses, which should be present given the clinical characteristics of sepsis, were not listed.

Hyperglycemia is a common finding in patients with sepsis and is considered a marker of a bad prognosis for severe clinical and surgical patients<sup>(11-12)</sup>. It is estimated that between 50 and 85% of ICU patients present hyperglycemia, but the diagnosis risk for unstable blood glucose was not identified in the patients<sup>(13)</sup>. Other diagnoses that would certainly be present in these clients, but which were not mentioned, are hyperthermia and hypothermia<sup>(10)</sup>. Body temperature changes

like fever and hypothermia are common findings in septic patients<sup>(14)</sup> and are associated with higher morbidity and mortality rates. Patients with hypothermia have a worse prognosis than patients with fever<sup>(15)</sup>.

On the other hand, it is observed that the ND ineffective cardiopulmonary tissue perfusion was present, related to the decompensation between ventilation and blood flow, impaired O<sub>2</sub> transportation and hyper or hypovolemia, and was manifested by arrhythmias, chest pain, bronchospasm and abnormal arterial blood gases. What characterizes septic shock is persistent arterial hypotension, despite volume resuscitation, demanding the administration of vasopressor drugs to maintain the blood pressure at adequate levels for life<sup>(16)</sup>. Hypotension results in tissue hypoperfusion, which can lead to the development of organ dysfunction, mainly of the brain, kidneys, heart and liver<sup>(17)</sup>.

Other NDs listed that were relevant were impaired spontaneous ventilation and impaired gas exchange. Due to the fact that these patients are severely ill, bedridden, with reduced awareness levels and often needing intubation, they were expected to present insufficient oxygenation or carbon dioxide elimination and inability to maintain adequate breathing<sup>(10)</sup>. In addition, the ND risk for aspiration was also adequate.

Hospitalized and severely ill patients are at a greater risk for aspirating gastric content and, consequently, for developing aspiration pneumonia. This risk is related to factors like the supine position, gastroparesis and use of narcotics. Aspiration episodes are frequent in ICU patients and entail severe consequences, increasing the morbidity rates. In this study, the ND risk for aspiration was related to the presence of tracheostomy, reduced level of consciousness, impaired swallowing and tube feeding.

The NDs risk for impaired skin integrity and impaired skin integrity were present in 81 patients and were related to mechanical factors, moisture, physical immobilization and impaired nutritional state. The defining characteristics of the ND impaired skin integrity were the destruction of skin layers and the disruption of the skin surface. These diagnoses are extremely pertinent in view of the Braden scores found.

The Braden Scale consists of six subclasses that reflect the degree of sensory perception, moisture, physical activity, nutrition, mobility, friction and shear<sup>(18)</sup>. In this study, the mean Braden score was 11, which indicates that the patients are at a moderate risk for the development of pressure ulcers.

The literature presents other studies in which the NDs of patients with sepsis, severe sepsis and septic shock were assessed<sup>(19-20)</sup>. Despite different methodological characteristics and a small number of participants, as observed, the NDs ineffective tissue perfusion, impaired spontaneous ventilation and risk for impaired skin integrity were also listed. This fact indicates similarities in the patients' clinical characteristics, independently of the place of study.

The mortality found in this study (78.64%) was higher than in the Brazilian and international literature. In Europe, total mortality rates of 27%, 32.2% and 54.1% were found in cases of sepsis, severe sepsis and septic shock, respectively, against 15%, 34.6% and 50% in Brazil, respectively<sup>(21-22)</sup>.

The high mortality found can be explained by the severe conditions of patients admitted to the ICU. In this study, patients with septic shock (61.2%) were predominant, with a mortality rate of 67.9%. The literature indicates diagnostic rates of septic shock equal to 52.1%, also being the highest cause of mortality (68.96%)<sup>(23)</sup>. One possible explanation for the high rate of patients

with septic shock can be the delayed diagnosis of sepsis, diagnosing only those patients in an advanced stage with greater possibility of death. Therefore, the mortality rate may have been overestimated. In this study, the patients' median age was 58 years for both sexes, in accordance with earlier studies that show that both the incidence and mortality due to sepsis increase with age<sup>(24-25)</sup>.

The prevalent infection focus in this study was pulmonary, responsible for 35.9% of the infections. This information is in accordance with the Brazilian and international literature. A recent Brazilian study showed that the main infectious focus of severe sepsis and septic shock was the respiratory tract, which was present in 53.8% of the patients<sup>(4,26)</sup>. The results are also in line with international studies<sup>(22)</sup>.

Some of the limitations in this study are related to its methodological design. A retrospective study was carried out, using information from patient histories. Hence, it is unavoidable that some conducts were modified in the course of the observation period. In addition, it cannot be controlled whether the registered information represented the patient's clinical condition at that time. A prospective study with daily assessment of the NDs and the prescribed interventions could provide other relevant information on nursing care for these clients.

## FINAL CONSIDERATIONS

The identification of the NDs present in the files of septic patients can contribute to nursing care for these clients. If implemented effectively, the NDs support the nursing team's actions for critical patients and, in addition, serve as a link with the multidisciplinary team that helps and enhances the expected outcomes, reducing the risks for complications and facilitating the implementation of actions. Consequently, this scenario is expected to improve patient care.

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