



DIAGNOSTIC AND NURSING INTERVENTIONS FOR OXYGENATION PROBLEMS IN THE ELDERLY WITH SEPSIS

DIAGNÓSTICOS E INTERVENÇÕES DE ENFERMAGEM PARA PROBLEMAS DE OXIGENAÇÃO EM IDOSOS COM SEPSE

DIAGNÓSTICO Y INTERVENCIONES DE ENFERMERÍA PARA PROBLEMAS DE OXIGENACIÓN EN EL ANCIANO CON SEPSIS

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ABSTRACT

Objectives: identifying the representative nursing diagnoses of oxygenation problems in elderly patients with sepsis and developing a proposed nursing care diagnoses, outcomes and nursing interventions. **Method:** A descriptive, cross-sectional study with a quantitative approach, involving 25 older adults with a diagnosis of sepsis, severe sepsis and septic shock. The data collection was conducted between February and June 2012, with a structured instrument. The data were analyzed by descriptive and presented in a statistical table. The research project was approved by the Research Ethics Committee, CAEE 0286.0.126.000-11. **Results:** facing the problems of oxygenation, eight representative nursing diagnoses, induced by sepsis, especially impaired spontaneous ventilation and impaired gas exchange were identified. **Conclusion:** Among the problems of physiological order, those related to oxygenation constituted the most incidents. It is hoped that this study may contribute to the nursing care of elderly patients with sepsis, especially with regard to the problems of oxygenation, quite frequent in these patients. **Descriptors:** Aged; Sepsis; Nursing Care.

RESUMO

Objetivos: identificar os diagnósticos de enfermagem representativos de problemas de oxigenação em idosos com sepse e elaborar uma proposta de assistência de enfermagem contendo diagnósticos, resultados e intervenções de enfermagem. **Método:** estudo descritivo e transversal, com abordagem quantitativa, envolvendo 25 idosos com diagnóstico médico de sepse, sepse grave e choque séptico. A coleta de dados foi realizada entre fevereiro a junho de 2012, com um instrumento estruturado. Os dados foram analisados a partir de estatística descritiva e apresentados em uma tabela. O projeto de pesquisa obteve aprovação no Comitê de Ética em Pesquisa, CAEE 0286.0.126.000-11. **Resultados:** frente aos problemas de oxigenação, foram identificados oito diagnósticos de enfermagem representativos, induzidos pela sepse, com destaque para ventilação espontânea prejudicada e troca de gases prejudicada. **Conclusão:** dentre os problemas de ordem fisiológica, aqueles relacionados à oxigenação se constituíram os mais incidentes. Espera-se que esse estudo possa contribuir para a assistência de enfermagem ao idoso com quadro séptico, especialmente, no que se refere aos problemas de oxigenação, bastante frequentes nesses pacientes. **Descritores:** Idoso; Sepse; Cuidados de Enfermagem.

RESUMEN

Objetivos: identificar los diagnósticos de enfermería representantes de problemas de oxigenación en pacientes ancianos con sepsis y desarrollar una propuesta de diagnósticos de cuidados de enfermería, resultados e intervenciones de enfermería. **Método:** un estudio descriptivo, transversal, con abordaje cuantitativo, con la participación de 25 adultos mayores con diagnóstico de sepsis, sepsis grave y shock séptico. La recolección de datos se llevó a cabo entre febrero y junio de 2012, con un instrumento estructurado. Los datos fueron analizados por el descriptivo y se presenta en una tabla estadística. El proyecto de investigación fue aprobado por el Comité de Ética de la Investigación, CAEE 0286.0.126.000-11. **Resultados:** frente a los problemas de oxigenación, fueron identificados ocho diagnósticos de enfermería representantes, inducidos por la sepsis, especialmente con problemas de ventilación espontánea y alteración del intercambio de gases. **Conclusión:** Entre los problemas de orden fisiológico, los relacionados con la oxigenación constituyeron la mayor cantidad de incidentes. Se espera que este estudio pueda contribuir a la atención de enfermería de los pacientes de edad avanzada con sepsis, especialmente con respecto a los problemas de oxigenación, bastante frecuentes en estos pacientes. **Descriptor:** Ancianos, Sepsis; Cuidados de Enfermería.

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INTRODUCTION

Sepsis constitutes a major cause of hospitalization and mortality in intensive care units not cardiological.¹⁻² It is a body's response to an infectious stimulus and is characterized by deregulation in inflammatory responses, anti-inflammatory and coagulation.³⁻⁴ It may be presented in different evolutionary stages: sepsis, severe sepsis and septic shock.⁴

In the stage of sepsis, the patient has a systemic inflammatory response associated with a proven or presumed infectious focus. In severe sepsis, there is at least one organ dysfunction associated with manifestations of tissue hypoperfusion, or hypotension. Already at the stage of septic shock, the patient has refractory hypotension to adequate fluid resuscitation, requiring the use of vasopressor agents.⁴

It is noteworthy that sepsis and its evolutionary stages have high incidence and mortality, especially when it comes to elderly patients because studies show that mortality in these patients ranges from 20 to 40%, reaching 60% when the clinical picture progresses to septic shock³, verifying highest mortality rates in the age group of 80 and older.⁵ The elderly are more prone to sepsis due to changes in the immune system, which reduces their ability to respond to bacteria as well as by functional decline of other defense mechanisms.⁶

It is important to detach that sepsis is characterized among other responses, changes in supply and oxygen extraction.⁷⁻⁸ Thus, the maintenance of tissue oxygenation, is a primary goal of nursing care in the treatment of critically ill patients in septic process. In this sense, the identification of diagnoses corresponding to oxygenation problems induced sepsis by nurses nursing becomes essential, since the establishment of nursing interventions based on scientific evidence can contribute to improving the quality of care, reducing the risk of pulmonary complications, such as the Acute Respiratory Distress Syndrome (ARDS).⁴

The relevance of this study is to address it a little discussed in the literature, both regarding the phenomenon of sepsis, as nursing care for elderly patients affected by this pathology theme. Moreover, the division of nursing diagnoses can support the planning and implementation of nursing interventions built on classification systems, seeking to resolve or minimize problems of oxygenation in these individuals.

Based on the foregoing, this study aims:

- Identifying nursing diagnoses representative of oxygenation problems in elderly patients with sepsis.
- Developing a proposal of nursing care diagnoses, outcomes and nursing interventions.

METHOD

This is a descriptive and cross-sectional study of a quantitative approach, performed in the Intensive Care Unit (ICU General) of a school hospital in the city of João Pessoa - Paraíba. This site was chosen for this study because sepsis is very common condition among assisted clients in this sector, consisting of a serious disease that requires multidisciplinary care of high complexity. It also contributed to the choice of this scenario as the locus of research because the researcher has worked as a resident nurse in that scenario.

The study population consisted of all elderly patients aged over 60 years old who were admitted to the ICU-General referred to the health facility. The determination of the sample was performed by time frame, from February to June 2012, consisting of 25 seniors who had a diagnosis of sepsis, severe sepsis and septic shock. For the inclusion of the elderly in the study, it was also considered the consent of the family, effective from the signing of the consent form by one of its members. For data collection, a structured instrument considering the variables of oxygenation component of Physiological mode belonging to the Roy Adaptation Theory⁹, and the literature relevant to thematic.⁶⁻⁷

Note that the data collection instrument was submitted to two expert nurses in Intensive Care, to appreciate the clarity and relevance of content. Similarly, the researcher conducted a pilot test with two elderly patients with sepsis, which were excluded from the sample, in order to verify that the issues defined in that instrument contributed to operationalize and answer the study objectives. The data collection was performed through the techniques of systematic observation and physical examination, and records of results of diagnostic and laboratory tests present in the record.

For preparation of nursing diagnoses classification it was used the System of North American Nursing Diagnosis Association - International (NANDA-I).¹⁰ The results of this trial have undergone review process paired

test between researcher and two nurses experts in the subject to ensure an agreed judgment on the empirical material and ensure more diagnostic accuracy.

To build the desired results or goals to be achieved by the nurse, it took into consideration the clinical applicability, favoring their use by clinical nurses for evaluation of nursing interventions. So prioritized up the theoretical framework proposed by Doenges, Moorhouse and Murr.¹¹

For the preparation of nursing interventions, it was used the Nursing Interventions Classification (NIC),¹² a classification system of comprehensive and standardized interventions performed by nurses. The data were compiled using the Statistical Package for Social Science (SPSS) version 18.0 for Windows. It was used the descriptive statistics, with absolute and percentage frequency. It is noteworthy that during the execution of the study, the standards established by Resolution N°. 196/96 of the National Health Council (CNS), which deals with researches done on humans.¹³ For such, we acted with full respect for human dignity. Prior to implementation, the research project was submitted to the Ethics Committee in Research of the educational institution where the study was

conducted, and approved under protocol number 511/11 and CAAE 0286.0.126.000-11.

RESULTS AND DISCUSSION

Regarding the identification variables of the study subjects, it was observed that more than half of elderly patients with sepsis were male -14 (56%), and 11 (44%) female. The age group with the highest prevalence was over 80 years old, with eight participants (32%). Regarding the evolutionary stages of sepsis, 11 (44%) were in septic shock, eight (32%) in sepsis and six (24%) in severe sepsis. This result is consistent with other studies in elderly patients with sepsis, which also identified that the majority had septic shock, with variable frequency from 70% to 73,7%.⁹⁻¹⁴

Regarding infection, the lung was the most frequent, occurring in 11 subjects (44%), followed by gastrointestinal / abdominal focus of five (20%), urinary passages, three (12%) and sepsis due to venous catheter infection in two (8%). It is noteworthy that in four seniors (16%) the focus was not identified. This corroborates with another study, where the authors found that 128 (84,2%) of septic patients had primary lung infection focus.⁶

Table 1. Nursing diagnoses identified in the elderly with sepsis regarding oxygenation problems-João Pessoa-Paraíba, Brazil, 2012.

Nursing Diagnosis	Total (n=25)	
	n	%
Impaired spontaneous ventilation	25	100
Impaired gas exchange	25	100
Ineffective airway clearance	23	92
Aspiration hazard	22	88
Risk of vascular trauma	21	84
Ineffective breathing pattern	17	68
Ineffective peripheral tissue perfusion	17	68
Risk of shock	14	56

As shown in Table 1, eight nursing diagnoses were identified; representative of oxygenation problems induced by sepsis, especially impaired spontaneous ventilation and impaired gas exchange, which occurred in 100% of the seniors surveyed.

The diagnoses mentioned herein are the result of acute lung injury secondary to vasodilation and increased capillary permeability induced by sepsis. These factors cause a carryover of liquid into the lung tissue and cause swelling, which triggers a reduction in lung compliance and reduces the capacity of its expansion, which, in turn, interferes with ventilation. In this case, it is possible that the use of mechanical ventilation is necessary.¹⁵

This mechanism promotes the patient with an imbalance between ventilation and pulmonary perfusion, impairing gas exchange, which leads to acute respiratory failure, evidenced by tachypnea, relationship PaO₂/FiO₂ low (between 200-300 mmHg) and the presence of infiltrates lung on chest radiography, which may lead to the development of a framework (ARDS).⁴

It should be noted that organic changes associated with senescence can contribute to potentiate respiratory disorders and lead to impairment of gas exchange, because, with age, there is a reduced mobility of the ribs, increased anteroposterior diameter, decreased efficiency of the respiratory muscles, lung stiffness increased and decreased alveolar surface area.¹⁶

A study with elderly septic found that progression to respiratory failure requiring invasive mechanical ventilation was associated with higher mortality in these patients, which is possibly associated with complications such as pneumonia, associated

with ventilation or respiratory muscle disuse and decline in lung function secondary to the aging process.⁶

Proposal for nursing care for problems of oxygenation in elderly with Sepsis:

Nursing diagnoses	Expected results	Nursing interventions (NIC)
Impaired spontaneous ventilation	The patient will maintain adequate ventilation through a respirator and will participate in efforts to wean the respirator, according to their ability.	Insertion and stabilization of artificial air ways; control of artificial air ways; control of invasive mechanical ventilation; weaning from mechanical ventilation.
Ineffective breathing pattern	The patient shall establish a normal breathing pattern and effectively after institution of mechanical ventilation, as evidenced by the lack of cyanosis and no use of accessory muscles for breathing;	Vital signs monitoring; respiratory monitoring.
Impaired gas exchange	The patient will present improving tissue oxygenation as evidenced the ABG.	Respiratory monitoring
Ineffective peripheral tissue perfusion	The patient will improve perfusion, evidenced by the palpable peripheral pulse.	Control of hypovolemia; quick replacement of liquids; monitoring of the lower extremities.
Aspiration hazard	The patient will not hinder suction.	Precautions against aspiration
Risk of shock	The patient will maintain hemodynamic stability, evidenced by vital signs within the normal range, normal capillary filling time, adequate urine output and level of normal consciousness.	Prevention of shock; control of vital signs.
Ineffective air way clearance	The patient should keep the air ways clear and demonstrate some reduction of pulmonary congestion.	Air way aspiration; positioning.
Risk of vascular trauma	The patient will not have signs and symptoms of phlebitis or local necrosis caused by infusion of vasoactive drugs.	Intravenous medication administration; intravenous therapy.

Figure 1. Diagnostics, expected results, and nursing interventions for problems of oxygenation in elderly with sepsis-João Pessoa-Paraíba, Brazil, 2012.

In Figure 1, there is a list of outcomes and nursing interventions for oxygenation problems identified in elderly patients with sepsis. Upon diagnosis ineffective spontaneous ventilation, the nurse should expect patient response to mechanical ventilation.¹¹ Therefore, we highlight the following activities: assessing the spontaneous breathing pattern; identify patients in need of real / potential airway insertion; collaborate with the physician in selecting the appropriate type and size of the endotracheal tube (TOT) or tracheostomy (TQT); assist in the insertion of TOT or TQT; check whether the client breaths are in phase with the respirator; observe the breathing pattern in general and differentiate between spontaneous breathing or adjusted by the respirator; raise the headboard and evaluate the physical and psychological disposition for ventilator weaning.¹²

For ineffective breathing pattern diagnosis, the nurse should expect the patient does not show cyanosis and use of accessory muscles. To do so, it shall determine the frequency, rhythm, depth and effort of breathing; registering thoracic movements, noting the existence of the use of accessory muscles, supraclavicular and intercostal retractions; monitor breathing patterns: bradypnoea, tachypnea, hyperventilation, Kussmaul breathing, Cheyne - Stokes, Biot and ataxic patterns.¹²

In relation to impaired gas exchange, the expected result is that there is improvement in tissue oxygenation. Thus, one should check the occurrence of peripheral and/or central cyanosis, respiratory secretions monitor, monitor pulse oximetry, registering changes in SaO₂, SvO₂, CO₂in arterial blood gases, listening for breath sounds and detect reduced breath sounds and presence of adventitious sounds; monitor chest radiography and determine the need for aspiration.¹¹

Regarding the diagnosis ineffective peripheral tissue perfusion, the nurse should expect the patient has improved perfusion, evidenced by a palpable peripheral pulse. To implement interventions for this diagnosis, you need to: control the hypovolemia with getting a caliber venous access to start replenishing fluids prescribed, as appropriate; monitor the hemodynamic response; monitor water conditions and levels of hemoglobin and hematocrit; check the availability of blood products for transfusion and, if necessary, monitor signs of impending renal failure (reduced urinary creatinine and urea increased); and monitor the lower ends by checking peripheral pulses, about the presence and characteristics.¹²

Diagnosis for risk for aspiration, the nurse must act to prevent aspiration. For this, we highlight the following activities: monitoring

the level of consciousness and cough reflex; position the client supine 90 degrees or as high as possible; maintain inflated tracheal cuff TOT or TQT; feeding the patient in small quantities and check the position of the probe before feeding the patient.¹²

Regarding the risk of shock diagnosis, are expected to keep the patient's circulatory status, reflected by hemodynamic stability, vital signs within the normal range, normal capillary refill time, adequate urine output and level of consciousness Normal.¹⁰ In this sense, the following activities can be implemented: monitor the appearance of early signs of systemic inflammatory response syndrome (SIRS), for example: high temperature, tachycardia, tachypnea, leukocytosis, leukopenia; invasive hemodynamic monitoring (central venous pressure - CVP - mean arterial pressure - MAP, mixed venous oxygen saturation), as appropriate; start early administration of antimicrobials and carefully monitor their effectiveness; monitor the circulatory state (blood pressure, temperature and color of the skin, presence and quality of pulses).¹²

Regarding the diagnosis of ineffective air way clearance, the patient should be with air ways clear, and demonstrate some reduction in pulmonary congestion.¹¹ Therefore, the main intervention is the aspiration of air ways beyond the proper positioning of the patient bed. For the effectiveness of these interventions, the activities of nurses consist in determining the need for oral or endotracheal aspiration, pay attention to the respiratory rate (RR) and the sounds (wheezing, rales, rhonchi), listening breath sounds before and after aspiration, hyperventilate and Hyperoxygenate every passage of tracheal suction catheter and the end of aspiration, administer expectorants and bronchodilators when prescribed observe the type and amount of secretions obtained and refer to culture.¹²

When considering the oxygenation component for risk diagnosis of vascular trauma, it is essential that the patient and no signs associated with phlebitis or local necrosis caused by vasoactive agent symptoms. To achieve these goals, prioritize the following procedures: verify incompatibilities with intravenous medication; following protocol for infusion, dilution and speed rates of drug or irritants; preparing an infusion pump; select the input connection of the line EV closest to the patient; irrigate the intravenous connection with appropriate solution, before and after administering the

drug; occlusive dressings maintain and monitor signals and infiltration of the infusion site phlebitis.¹²

CONCLUSION

Among the problems of physiological order, those related to oxygenation were formed among the most prevalent in the elderly with sepsis, therefore, highlights the relevance of care provided by nursing staff, compared to this phenomenon. It is emphasized that nursing care should be deliberate, systematic, based on theoretical and scientific foundation, and its use as an essential method of work of the nursing process.

The use of classification systems enables the standardization of the language of nurses; beyond assisting in care providing directed and grounded in scientific knowledge. Accordingly, eight nursing diagnoses representative of oxygenation problems induced by sepsis were identified, as proposed nursing interventions that could be used by nurses as subsidies for improving the quality of nursing care to these individuals. It is hoped that this study may contribute to the nursing care of elderly patients with sepsis, especially with regard to the problems of oxygenation, quite frequent in these patients. Due to limitations in sample size, we suggest further studies with a focus on larger samples and populations of other institutions.

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