

The nursing diagnosis of aspiration risk in critical patients*

Diagnóstico de enfermagem risco de aspiração em pacientes críticos

Diagnóstico de enfermería para el riesgo de aspiración en pacientes críticos

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ABSTRACT

Objective: To analyze the nursing diagnosis of risk of aspiration and the relationship with its risk factors in the patient hospitalized in the intensive care unit. **Methods:** A transversal study undertaken in the adult intensive care unit of a teaching hospital in the Northeast of Brazil, with a sample of 86 patients. The data were collected through the use of an interview questionnaire and physical examination in October 2013 - May 2014. **Results:** The diagnosis was present in 43 patients (50%). A total of 17 risk factors was identified: related mainly to swallowing, enteral nutrition, gastrointestinal motility, gastric emptying, neurological standard, ventilation interfaces, events which were secondary to the treatment, and surgical procedures. **Conclusion:** The diagnosis of risk of aspiration and its risk factors are present in the critical patients, making the planning of care in this context fundamental.

Keywords: Nursing diagnosis; Intensive Care; Health care.

RESUMO

Objetivo: Analisar o diagnóstico de enfermagem: risco de aspiração e a relação com seus fatores de risco no paciente internado na unidade de terapia intensiva. **Métodos:** Estudo transversal, realizado na unidade de terapia intensiva adulto de um hospital universitário no Nordeste do Brasil, com uma amostra de 86 pacientes. Os dados foram coletados mediante utilização de formulário de entrevista e exame físico, nos meses de outubro de 2013 a maio de 2014. **Resultados:** O diagnóstico esteve presente em 43 pacientes (50%). Foram identificados 17 fatores de risco, relacionados principalmente a deglutição, nutrição enteral, motilidade gastrointestinal, esvaziamento gástrico, padrão neurológico, interfaces de ventilação, eventos secundários ao tratamento e procedimentos cirúrgicos. **Conclusão:** O diagnóstico risco de aspiração e seus fatores de risco estão presentes nos pacientes críticos, tornando-se fundamental o planejamento dos cuidados neste contexto.

Palavras-chave: Diagnóstico de enfermagem; Cuidados Intensivos; Assistência à saúde.

RESUMEN

Objetivo: Analizar el diagnóstico de enfermería: riesgo de la aspiración y la relación con factores de riesgo en pacientes de una unidad de cuidados intensivos. **Métodos:** Estudio transversal realizado en una unidad de cuidados intensivos adultos en un hospital universitario del Noreste de Brasil con 86 pacientes. Los datos fueron recolectados por medio de entrevistas y examen físico, entre Octubre de 2013 y Mayo de 2014. **Resultados:** El diagnóstico estuvo presente en 43 pacientes (50%). Se identificaron 17 factores de riesgo, relacionados principalmente con la deglución, nutrición enteral, motilidad gastrointestinal, vaciamiento gástrico, patrón neurológico, interfaces de ventilación, eventos secundarios relacionados con el tratamiento y procedimientos quirúrgicos. **Conclusión:** El diagnóstico de riesgo de aspiración y sus factores de riesgo están presentes en los pacientes críticos, haciendo fundamental el direccionamiento del cuidado en ese contexto.

Palabras clave: Diagnóstico de Enfermería; Cuidados Intensivos; Prestación de Atención en Salud.

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INTRODUCTION

Patients who are hospitalized in intensive care units are more exposed to situations of risk than those attended in other hospital environments, as they require complex therapies and technological apparatus, as well as the frequent need for invasive procedures undertaken with the aim of keeping them alive. In the light of this, due to the seriousness of their conditions and clinical instability, these patients require complex care on the part of the team, which requires the nurse to make critical evaluations and carry out immediate interventions¹.

In this context, nursing has a strong influence on the recovery of critically-ill patients, as the focus of the nurse's work process is the holistic care for the individual, with emphasis on maintaining their homeostatic balance and the prevention of iatrogenic conditions². To this end, the nurse needs to carry out her actions in a standardized way, and based in the profession's own body of knowledge. This process occurs initially through assessment of the patient, a stage which is fundamental for the construction of an individualized care plan³.

The elaboration of the individualized care plan aims to check the patients' state of health and the diagnosis of their needs, and must be based on the stages of the Nursing Process (NP)⁴. The NP is a methodological instrument which is peculiar to nursing, and is indispensable for ensuring an appropriate and humanized care practice. It is made up of five interlinked and dynamic stages, namely: data collection, nursing diagnosis, the planning of actions, nursing intervention, and assessment of the results^{4,5}.

The nursing diagnosis makes it possible to elaborate interventions which can be determinant in the results. Among the systems of classifications for nursing diagnoses, emphasis is placed on the NANDA-International (NANDA-I)⁶.

The NANDA-I classification system organizes the diagnoses in domains, among which emphasis is placed on domain 11, titled Safety and protection. The diagnoses of this domain are identified with greater frequency in critical patients⁷. The diagnosis of Risk of Aspiration, belonging to the class of physical injuries, is defined as the risk of entry of gastrointestinal secretions, oropharyngeal secretions, solids or fluids into the tracheobronchial passages. This diagnosis is represented by 22 risk factors⁶.

It is known that critical patients have a greater risk for the entrance of secretions into the respiratory airways, due to various factors such as: gastroparesis, the presence of the endotracheal tube, reduced level of consciousness, and complex pharmacological therapy. The aspiration of secretions is closely linked to the occurrence of aspiration pneumonia, which increases mortality, length of hospitalization, the duration of mechanical ventilation, and treatment costs^{8,9}.

Thus, in spite of the existence of studies which investigate the diagnosis of Risk of Aspiration in critical patients, there is a need for detailed knowledge of the risk factors which define the presence of the diagnosis; and which, once known, make it possible to direct the nurse's actions towards prevention^{7,10,11}.

To this end, this study aimed to analyze the diagnosis of Risk of Aspiration and the relationship with its risk factors in the patient hospitalized in the intensive care unit.

METHODS

This study is of the observational and transversal type, and was carried out in the adult intensive care unit (ICU) of a teaching hospital in a state capital in the Northeast of Brazil, in the period October 2013 - May 2014.

The study population was made up of 791 patients. The strategy for defining the sample was defined as the number of patients hospitalized in the above-mentioned ICU in the period of one year. For calculating the sample, a formula developed for studies with finite populations was used, considering a level of confidence for the study of 95% ($Z_{\alpha} = 1.96$) and a sampling error of 10%; in relation to the prevalence of the event, the conservative value of 50% was considered. As a result, the sample was made up of 86 patients.

The selection of patients took place by convenience and consecutively. The following were used as inclusion criteria: age equal to or over 18 years old, and patients who had received clinical or surgical treatment. The exclusion criteria were: patients hospitalized in the unit for a period of less than 24 hours, bearing in mind that some clinical data can only be observed in a period equal or superior to 24 hours.

Data collection was undertaken through a questionnaire made up of questions relating to the patient's medical history and the physical examination, which are directed towards assessing the risk factors for the diagnosis of risk of aspiration. To this end, the instrument was constructed based on the risk factors for the diagnosis of risk of aspiration found in NANDA-I⁶.

In order to reduce the bias related to information collection, a collection protocol was constructed, which detailed the standardization of the procedures for measuring the variables. This collection instrument was subjected to face validation by three nurses who are intensive care specialists. Following the incorporation of their suggestions, the researcher responsible proceeded to apply the pretest with nine patients. There being no need for alterations, the participants in the pretest were included in the sample.

Furthermore, prior to undertaking the collection, a training session was held lasting three hours, run by the researcher, aimed at those collecting the data, with a view to ensuring the internal reliability of the data. To this end, the training addressed topics referent to intensive care, the critical patient and the nursing diagnosis of risk of aspiration, along with its respective risk factors, all the items of the collection instrument being explained.

Thus, after the training of the collectors, data collection was undertaken between October 2013 and May 2014, by the researcher, a resident, and a student of nursing on the scientific initiation program.

In order to organize and analyze the data, a database was constructed using the Microsoft Office Excel software, in which were recorded the clinical variables and the risk factors for the diagnosis studied. Once the database contained all the factors mentioned above, the researcher filled out the database based on the information present in the patients' questionnaires, defining whether the risk factor was present or absent.

Once the presence or absence of each risk factor had been defined by the researcher responsible, the database was referred for consideration by the three nurse specialists in the areas of intensive care and/or nursing diagnoses, so that they could undertake the process of diagnostic inference regarding the presence or absence of the diagnosis in the patient. In the event of disagreement among those making the diagnoses, majority rule was applied, in which the diagnosis is considered present when two or more of those making the diagnoses consider it to be present.

Those making the diagnoses were selected intentionally based on assessment of their curriculums. The selection criteria were: to have published articles referent to the Systematization of Nursing Care** and/or specialization or experience in the area of intensive care.

For analysis of the data, the Statistical Package for the Social Sciences (SPSS) Version 20.0 for Windows statistical package was used. Thus, the relative and absolute frequencies, means, medians and standard deviation were calculated. To this end, the Kolmogorov-Smirnov test was identified for checking the normality of the numerical data. In the analysis of the association of the nominal data, Fisher's exact test was used. The analysis was based on the reading of the descriptive statistics, as well as on the analysis of the p value found. For statistical significance, a level of 5% was adopted.

The study was submitted to the Research Ethics Committee of the institution responsible for the research. It received a favorable opinion under protocol N^o. 440/414 and obtained Certificate of Presentation for Ethical Appreciation (CAAE) N^o 22955113. 2.0000.5292.

RESULTS

A total of 86 patients receiving inpatient treatment in ICU was evaluated, of whom 52.3% were female. The patients were predominantly of mixed ethnicity (55.8%), practiced a religion (95.3%), had a partner (70.9%) and had an income of one to three minimum salaries (79.1%). Regarding where they were from, 61.6% came from the rural areas of the state. The patients' mean age was 53.4 years old (± 16.5), with a minimum age of 18, and a maximum of 81 years old.

In relation to the clinical data and data regarding their hospitalization in the unit, it was observed that the majority of the patients (73.3%) had been admitted to ICU following surgery, or for treatment of complications associated with surgery. The study also evidenced that the majority of the patients (70.9%) had chronic illnesses.

Of the 86 patients who participated in the study, 43 (50%) presented the nursing diagnosis of risk of aspiration. Among the 22 risk factors covered under the diagnosis, 17 were present in this clientele, namely: Tube feeding; Neck surgery; Impaired swallowing, Secondary events related to the treatment; Incompetent lower esophageal sphincter; Delayed gastric emptying; Reduced gastrointestinal motility; Reduced level of consciousness; Presence of tracheostomy; Presence of endotracheal tube; Increased intragastric pressure; Reduced cough reflex; Reduced gag reflex; Increased gastric residual; Situations hindering elevation of upper body; Gastrointestinal tube; and Neck trauma.

Of the 17 risk factors present in the patients with the diagnosis of risk of aspiration, only eight presented statistical significance ($p < 0.05$), namely: gastrointestinal tube, impaired swallowing, reduced level of consciousness, tube feeding, presence of endotracheal tube, secondary events related to the treatment, delayed gastric emptying, and increased gastric residual, as shown in Table 1.

DISCUSSION

Regarding the presence of the diagnosis of risk of aspiration in critical patients, one study undertaken in an intensive care unit in the Southeast of Brazil evidenced the prevalence of this diagnosis in 60.8% of the patients, which corroborates the results of the present study¹⁰. Another study ratifies the striking presence of this issue in ICU patients, highlighting the percentage of 98.7% of individuals with risk for aspiration¹¹.

It follows that, in understanding the high risk of aspiration among these patients, preventive measures must be adopted with a view to minimizing possible complications. In this regard, the study promotes efficacious intervention for reducing the risk of aspiration, such as keeping the bedhead raised at a level greater than 30° for mechanically ventilated patients¹².

In addition to this, the study which aimed to implement a protocol with directives aimed at reducing aspiration in patients undergoing thoracic surgery identified that prior to the application of the protocol by the nurses, the rate of developing pneumonia among the patients was 11%; following the implementation, no patient developed pneumonia, showing it, therefore, to be efficacious in reducing this condition resulting from aspiration¹³.

In this regard, one can see the importance of applying preventive measures to this clientele. For this, the need is evidenced to identify the risk factors which have the greatest association with this issue. As a result, tube feeding was listed among the risk factors which are relevant for the diagnosis of risk of aspiration. It is known that nutritional support provides critical patients with the energy intake which is necessary for meeting their metabolic needs. Feeding at an early point is associated with reducing the severity of the illness and complications, as well as reducing length of hospitalization¹⁴.

Among critical patients, oral ingestion is often impaired as a result of clinical conditions which contraindicate its use, it becoming necessary to feed the patient by other routes, among

Table 1. Distribution of the risk factors for the nursing diagnosis of risk of aspiration, which presented significant association in patients receiving inpatient treatment in the intensive care unit. Natal, State of Rio Grande do Norte (RN), 2014

Risk factors	Risk of aspiration			Statistics
	Present	Absent	Total	
Gastrointestinal tube				
Present	33	00	33	$p = 0.000^*$
Absent	10	43	53	
Total	43	43	86	
Impaired swallowing				
Present	31	02	33	$p = 0.000^*$
Absent	12	41	53	
Total	43	43	86	
Reduced level of consciousness				
Present	28	00	28	$p = 0.000^*$
Absent	15	43	58	
Total	43	43	86	
Tube feeding				
Present	24	00	24	$p = 0.000^*$
Absent	19	43	62	
Total	43	43	86	
Presence of endotracheal tube				
Present	17	00	17	$p = 0.000^*$
Absent	26	43	69	
Total	43	43	86	
Secondary events related to the treatment				
Present	12	01	13	$p = 0.001^*$
Absent	31	42	73	
Total	43	43	86	
Delayed gastric emptying				
Present	07	00	07	$p = 0.006^*$
Absent	36	43	79	
Total	43	43	86	
Increased gastric residual				
Present	07	00	07	$p = 0.006^*$
Absent	36	43	79	
Total	43	43	86	

* Fisher's Exact Test.

which emphasis is placed on feeding via gastrointestinal tube. This means of feeding, however, is not free of risk, as aspiration of secretions in airways can occur, along with diarrhea, vomiting, hyponatremia and hyperglycemia^{14,15}.

Continuing in relation to the use of the gastrointestinal tube, this stimulates gastroesophageal reflux and the consequent

aspiration of gastric content into the lungs, leading to the emergence of respiratory infections. The aspiration of secretions in airways is associated not only with the presence of tube feeding, but also with the caliber of this device, the infusion of food (continuous or intermittent) and the positioning of the patient in the bed¹⁵.

The risk factors of increased gastric residual and delayed gastric emptying were also associated with the risk of aspiration in the sample studied. The checking of the gastric residual once every six hours is highlighted as an essential nursing care step for the identification of delay in gastric emptying and identification of increased gastric volumes; moreover, measurements of gastric residual above 200 ml in the period of six hours are configured as high, predisposing to the occurrence of gastric distention and consequent episodes of vomiting and aspiration of gastric content in the airways¹.

Contradicting this, some authors evidence in their studies that the presence of gastric residual does not influence the occurrence of aspiration, given that various factors influence the aspiration of this content, including the caliber, size and location of the tube, as well as the viscosity of the residual liquid¹⁵⁻¹⁷. In this perspective, corroborating this context, a study which aimed to identify association between the gastric residual and the frequency of aspiration of gastric content in 206 critical patients ascertained that although 92.7% of the patients presented at least one tracheal secretion positive for pepsin, there was no consistent correlation between aspiration and gastric residual¹⁸.

Some important characteristics regarding this aspect, however, must be emphasized, such as, for example: aspiration occurred with significant frequency when there was low residual gastric content, although it occurred with greater significance when the content was high. Furthermore, the study emphasizes the importance of this analysis taking into consideration the characteristics of the patient, such as level of consciousness, sedation, position of the bedhead, the presence of vomit, and the seriousness of the illness. It also reveals that it is important to measure the gastric residual, which must be undertaken at an interval of four hours in order to evaluate those critical patients who are at greatest risk for aspiration¹⁸.

The risk factors of impaired swallowing and presence of endotracheal tube appeared in the study as relevant, corroborating a study undertaken with a similar population in the Southeast of Brazil when they state that dynamic changes in the oral and pharyngeal phase of swallowing are common in critical patients, principally those being mechanically ventilated through an endotracheal tube¹⁹.

Factors which predispose to the risk of aspiration among these patients are many in number, and include uncoordinated timing of breathing and swallowing and atrophy in the musculature of the tongue, pharynx and larynx associated with lack of use resulting from endotracheal intubation, as well as the effect of sedative drugs, opioids and neuromuscular blockers²⁰.

Regarding the risk factor of reduced level of consciousness, the bibliographic findings indicate that patients with altered level of consciousness present greater predisposition for the aspiration of secretions in the airways, taking into account the reduction of the airways protective reflexes, such as the cough and gag reflexes. These authors also emphasized the need for rigorous assessment on the part of the nurse regarding the patient's level of consciousness, so as to identify, at an early stage, changes in

the neurological situation, as well as in the standard of swallowing, thus avoiding the risk of bronchoaspiration^{3,15}.

The risk factor of secondary events related to the treatment was also considered to be present in the clientele which participated in the present study. This factor may be related principally to the drug therapy. One study undertaken with critical patients evidenced that the tolerance of the nutritional therapy can be limited due to gastrointestinal events attributed to drug therapies administered simultaneously. This study also showed that the main gastrointestinal events related to the use of drugs were: constipation, diarrhea, abdominal distention, vomiting and pulmonary aspiration²¹.

It is very common to administer analgesics, sedatives and neuromuscular blockers in intensive care, in order to provide comfort, pain relief, and reduction in the patient's stress. This therapy, however, causes an increase in the risk of aspiration, as it can cause lowering in the level of consciousness, reduction in the reflexes protecting the airways, and reduction of intestinal motility, with a consequent increase in gastric residual, predisposing to episodes of vomiting^{3,21}.

Based on the above, it is recognized that the early identification of the main risk factors related to the risk of aspiration in patients in critical-care units allows the nurse to carry out interventions capable of preventing this problem and, consequently, the resulting complications.

CONCLUSIONS

The present study analyzes the association of the nursing diagnosis of risk of aspiration and its risk factors in patients hospitalized in an intensive care unit. This diagnosis was present in half of the critical patients who participated in this study. Among the factors which were associated with this diagnosis, one can highlight impaired swallowing, gastrointestinal tube, tube feeding, reduced level of consciousness, presence of an endotracheal tube, secondary events related to the treatment, delayed gastric emptying and increased gastric residual.

The study of the main nursing diagnoses in critical patients allows the nurse to identify the risk factors which directly influence the care, contributing to the precise definition of the priority nursing care for maintaining quality care.

As a result, it is worth emphasizing the importance of studies which investigate the diagnostic inference undertaken by the nurse, qualifying the work of the professional, and broadening to the area's body of knowledge. As a limitation of this study, emphasis is placed on the difficulty of undertaking research with critical patients, given that they are often unconscious, disoriented and restricted to their beds, hindering the measuring of important data for the physical examination.

As a result, it is recommended that similar studies should be undertaken with other priority diagnoses for the care of the seriously-ill patient, such that the nurse may be able to make use of the knowledge which is necessary for optimizing the care, and such that instruments may be created which guide the nurse's diagnostic reasoning in her practice.

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** Similar to the Nursing Process. Translator's note.