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INTEGRATIVE LITERATURE REVIEW

RISK FACTORS FAVORING PNEUMONIA ASSOCIATED WITH MECHANICAL VENTILATION

FATORES DE RISCO QUE FAVORECEM A PNEUMONIA ASSOCIADA À VENTILAÇÃO MECÂNICA FACTORES DE RIESGO QUE FAVORECE LA NEUMONIA ASOCIADA A LA VENTILACIÓN MECÁNICA

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ABSTRACT

Objective: to analyze the main risk factors that favor pneumonia associated with mechanical ventilation. Method: this is a bibliographical study, type integrative review, in which the articles consulted were in the Lilacs Databases, Medline the Scielo Virtual Library. It is reported that the search was performed in January 2018 and a final sample of 20 articles, presenting the results in figure. Results: the importance of the nurse's attention to patients who are in the intensive care setting and need mechanical ventilation in order to prevent, diagnose and treat pneumonia associated with mechanical ventilation was observed. Conclusion: it is revealed that, among the main risk factors for the occurrence of the problem, the most relevant are the incorrect hygiene practices carried out by the health team in view of the existence of many opportunistic pathogens that could easily be eliminated by effective hygiene. *Descriptors*: Risk Factors; Pneumomia; Disease Prevention; Ventilation; Nursing; Intensive Care Units.

RESUMO

Objetivo: analisar os principais fatores de risco que favorecem à pneumonia associada à ventilação mecânica. Método: trata-se de estudo bibliográfico, tipo revisão integrativa, em que os artigos consultados foram nas Bases de Dados Lilacs, Medline a Biblioteca Virtual Scielo. Informam-se que a busca foi realizada em janeiro de 2018 e amostra final de 20 artigos, apresentando-se os resultados em figura. Resultados: observou-se a importância da atenção do enfermeiro com pacientes que se encontrem em ambiente de terapia intensiva e necessitem da ventilação mecânica a fim de prevenir, diagnosticar e tratar uma pneumonia associada à ventilação mecânica. Conclusão: revela-se que, em meio aos principais fatores de risco para a ocorrência do problema, os mais relevantes são as práticas incorretas de higiene realizadas pela equipe de saúde tendo em vista a existência de muitos patógenos oportunistas e que facilmente poderiam ser eliminados por meio de uma higiene eficaz. Descritores: Fatores de Risco; Pneumonia; Prevenção de Doenças; Ventilação; Enfermagem; Unidade de Terapia Intensiva.

Objetivo: analizar los principales factores de riesgo que favorecen la neumonía asociada a la ventilación mecánica. Método: se trata de estudio bibliográfico, tipo revisión integrativa, en que los artículos consultados fueron en las Bases de Datos Lilacs, Medline a Biblioteca Virtual Scielo. Se informan que la búsqueda fue realizada en enero de 2018 y muestra final de 20 artículos, presentándose los resultados en figura. Resultados: se observó la importancia de la atención del enfermero con pacientes que se encuentren en un ambiente de terapia intensiva y necesiten la ventilación mecánica a fin de prevenir, diagnosticar y tratar una neumonía asociada a la ventilación mecánica. Conclusión: se revela que, en medio de los principales factores de riesgo para la ocurrencia del problema, los más relevantes son las prácticas incorrectas de higiene realizadas por el equipo de salud teniendo en vista la existencia de muchos patógenos oportunistas y que fácilmente podrían ser eliminados por el equipo de salud medio de una higiene eficaz. Descriptores: Factores de Riesgo; Neumonía; Prevención de Enfermedades; Ventilación; Enfermería; Unidades de Cuidados Intensivos.

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INTRODUCTION

It is known that the Intensive Care Units (ICUs) emerged as a response to the treatment of severe users, constituting

hospital areas destined to critical users who require highly complex care, as well as strict control.1

It is identified that, in Brazil, ICUs began in the 1970s, enabling the mission of providing excellence care, aiming at the recovery of the severe patient by constant adequate monitoring, using operational resources, generating and disseminating knowledge through scientific research and always maintaining a holistic view.²

It is emphasized that nurses have an important role in mechanical ventilatory assistance, since it is they who plan, conduct and supervise the care provided to the patient who needs this support.³

It is observed that some precautions are essential to reduce the adverse effects of mechanical ventilator installation maintenance, such as: monitoring ventilatory parameters; controlling the general patient; conditions of the maintain humidification of the heating of inhaled gases under appropriate conditions, in addition to the mobilization and withdrawal of secretions when necessary.3

A degree of experience is required in planning ventilatory care and it should be administered by persons with appropriate training and with proven ability.4

It is shown that the vast majority of critically ill patients hospitalized in an intensive care unit (ICU) need mechanical ventilation (MV). It is reported that during this period, the patient undergoes a process of mechanical ventilation transition. It is shown that mechanical ventilation totally or partially replaces spontaneous ventilation and is indicated for acute or chronic acute respiratory failure.

The improvement of gas exchange and the reduction of respiratory work is favored by mechanical ventilation, and can be used noninvasively, through an external interface, usually a face mask, and in an invasive way, by means of a tube endotracheal tube or tracheostomy cannula.

Mechanical ventilation⁵ is constituted in a supportive method for the treatment of patients with acute or chronic respiratory insufficiency with objectives, besides maintaining the gas exchanges, to alleviate the work of the respiratory muscles which, in acute situations of high demand metabolic, is

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high; reverse or prevent respiratory muscle fatigue; reduce oxygen consumption by reducing respiratory discomfort and allowing the application of specific therapies.

Nursing diagnoses (ND), once inserted in care, are allowed a unique language, since they make it possible to understand and facilitate decision-making regarding necessary interventions for each patient, thus improving the quality of care provided.6

The method is divided into two groups: invasive mechanical ventilation noninvasive ventilation. It is shown that, in both situations, artificial ventilation is achieved with the application of positive airway pressure.

The two methods are differentiated by the form of pressure release: whereas in invasive ventilation a prosthesis introduced into the airway is used, that is, a oro or nasotracheal tube (less common) or a tracheostomy cannula, in non-invasive ventilation used a mask as the interface between the patient and the artificial ventilator. It is noticed that, in patients submitted to prolonged ventilatory support, it is important to measure their muscular strength, respiratory drive and chest mechanics conditions for appropriate weaning of these cases.

Mechanical ventilation is indicated in the following cases: in Acute Respiratory Insufficiency - ARI secondary to heart failure, pneumonia, sepsis and asthma; exacerbations of chronic respiratory failure secondary to surgical complications and trauma; acute lung and Acute Respiratory Syndrome; cardiorespiratory resuscitation; neuromuscular diseases and intraoperative ventilatory support.7

Acute respiratory insufficiency commonly observed in this group of patients, being caused by infections, primary pulmonary disease or even cardiogenic pulmonary edema after 16 chemotherapies. It should be noted that some studies with adults and pediatric patients have reported an unsatisfactory outcome and a very high mortality rate in immunosuppressed patients requiring mechanical ventilation.

The indications are varied according to the objectives to be achieved, ie in emergency situations, especially when life risk does not allow a good evaluation of respiratory function, clinical impression is the most important point in the indication of assisted MV by some laboratory parameters.⁵

Ventilatory assistance can be understood as maintaining patients' oxygenation and/or ventilation artificially until they are able to

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reassume them. This care is important for patients undergoing general anesthesia and for those hospitalized in intensive care units with respiratory insufficiency.

Nursing interventions are referred to any care, based on the judgment and clinical knowledge of the nurse, based on a scientifically based action, performed and planned for the benefit of the patient and in response to a Nursing diagnosis. It is noted that the Nursing Interventions Classification (NIC) contains interventions and activities performed by nurses in an orderly and structured manner. It should be noted that each nursing diagnosis is related to several interventions, being divided into priority, suggested and additional optional. It is reported that the priorities relate well to the cause of the diagnosis and have more activities and interventions likely to solve the problem.9

It is verified that Nursing care for a patient in MV requires technical and interpersonal competence. It is reported that the nurse needs to perceive the changes in the health status of the patients, to interpret and intervene correctly using the Nursing process. 9

It is explained that pneumonia is an inflammation that arises in the pulmonary parenchyma affecting not only the lung tissue but also the respiratory bronchioles, alveoli interstices, which are full Ωf and inflammatory exudates, leading reduction in gas exchange. It is described that this inflammation occurs when a microorganism or infectious agent, such as viruses, bacteria. fungi, protozoa, immunoallergic agents, among others, reach the pulmonary parenchyma causing this inflammation of the lung tissue. 10

It should be pointed out that pneumonia associated with mechanical ventilation (VAP) occurs in approximately 25% of patients in ventilatory assistance caused by multiresistant (MR) bacteria, which constitute a challenge in clinical practice and in the care of critically ill patients in Brazil, Latin America and all around the world.¹¹

Mechanically ventilated (MV) is known to be strongly associated with the development of nosocomial pneumonia. It is shown that pneumonia is an inflammatory response due to penetration and uncontrolled multiplication of microorganisms in the lower respiratory tract. ¹⁰

The risk factors for the development of VAPs are classified as modifiable and nonmodifiable. It is determined that the nonmodifiable are: age, severity score at ICU admission, and presence of comorbidities. It should be noted that the modifiable factors are related to the microbiota of the ICU itself, justifying the importance of knowing the most frequent agents in each specific place. It is revealed that knowledge of the local microbiota improves the prescription of antimicrobials, which should be done as soon as there is suspicion of VAP.¹²

However, the pathogenesis in question is conceptualized as avoidable because it is related to "the use of invasive equipment and/or specific procedures, presenting, at its origin, some possibly alterable event". 13

It is complemented that the VAP is generally of aspirative origin, the main source being the secretions of the upper pathways followed by the exogenous inoculation of contaminated material or the reflux of the gastrointestinal tract. These aspirations are generally shown to be silent microaspirations, rarely with macroaspirations that, when they do occur, present severe and rapidly progressive respiratory insufficiency. 10

This ventilatory support is com- plemented by ventilator-associated pneumonia (VAP), being the main cause of death due to hospital infection. It is considered that among the factors that trigger this infection is oropharyngeal colonization, which can be minimized through preventive care.⁴

A high volume, intensity and complexity of care is required in the care environment for critical patients, aiming at the early definition of clinical disorders and technology, requiring the constant updating of the Nursing corps which, when printing its workforce in therapy intensive, requires different knowledge and skills.

Variables are related to patient care in invasive ventilatory support constituting the main focus of the research and having been extensively explored. It stands out. in this sense, that the care that stood out the most was the strict monitoring of water balance and respiratory rate, as well as the hygiene of the hands before the development of procedures to the user, besides the change of decubitus.¹⁴

The interaction between the pathogen, the host and the epidemiological variables that facilitate this dynamics is involved in the pathogenesis of health care-related pneumonia. It is emphasized that several mechanisms contribute to the occurrence of these infections, but the role of each of these factors remains controversial, and may vary

according to the population involved and the etiological agent. 15

It is recommended, in this sense, the constant update of the nurse and, at the same time, there is a need to master each specific topic within an intensive care setting, in this case, the mechanical ventilator, since it presents to the patient a support of life.

This proposition is justified by the importance of knowing the nurse's doing through production due to the specific Nursing care given to the patients in a critical situation of life.

It is possible to appropriate, in this view, knowledge as a work instrument of the nurse applied to his work objective, ie, patient affected by a critical situation, such as pneumonia associated with mechanical ventilation, which is then transformed by their practice to establish care measures related to clinical knowledge, physiology and pathology circumscribed to the use of the ventilator.

OBJECTIVE

• To analyze the main risk factors that favor ventilator-associated pneumonia.

METHOD

This is a bibliographical research, using the qualitative method and, for this, systematic reading was done in order to define the categories for the deepening and discussion about mechanical ventilation involving scientific work carried out by health professionals.

The integrative review method was used, following the following steps: 1) Establishment of objectives; 2) Establishment of criteria for inclusion and exclusion of articles; 3) Definition of the information to be extracted from the selected articles; 4) Analysis of results; 5) Discussion; 6) Presentation of results.

To select the articles, the Lilacs (Latin American Literature in Health Sciences) and Medline (Medical Literature Analysis and Retrieval Sistem Online) databases and the Scientific Electronic Library Online were consulted. Descriptors were classified as mechanical ventilation pneumonia and associated with mechanical ventilation. totaling approximately 5,470 results. These terms are included in the Descriptors in Health Sciences (DeCS) and Medical Subject Headings (MeSH).

The following articles were used as inclusion criteria: articles that addressed the

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main factors of ventilator-associated pneumonia; articles published in English and Portuguese in the period between 2005 and 2017

The articles in Portuguese resulted in 5,330 studies. Those who were not in full and still chose the full texts were excluded, from which were selected the articles that were in the proposed period, adding 500, refined by the subject, that is, pneumonia associated with mechanical ventilation, there are 234 articles. It is reported that, with the exclusion of the oldest articles, only 27 articles remained, of which 20 were analyzed with six different variables.

Articles containing foreign languages were excluded or other features not applicable to this analysis were included. The following controlled descriptors were used in the article search: Mechanical Ventilation; Associated pneumonia; Intensive care; Prevention.

In a second moment, a summary of the bibliographic material obtained, with an exploratory character, was carried out in order to verify the interest in the research. It is reported that the sample consisted of 20 articles that were submitted to selective reading to select the materials that really interested the research with an analytical reading to order the information present in the sources and, finally, the interpretive reading, more complex, to relate what is said by the author with the subject in question.

Primary variables: Sex; Age; Prevention; Stage of disease; Environment; Professionals. **Secondary variables:** Procedures performed; Recurrence; Diagnosis; Hygiene.

It is reported that the search was performed in January 2018 and a final sample of 20 articles. In the Microsoft Office Excel 2010 for Windows program, a figure with the following variables was built for data analysis: article title, authors, year of publication, intervention studied, result and conclusion.

RESULTS

It is stated that, in general, the research was finished with 20 scientific articles, whose objectives coincided with the objectives of this research, having as main subject the risk factors of pneumonia associated with MV. It is emphasized that this evidence was not defined as inclusion criterion, but as a random finding.

It should be noted that the year 2011 presented a more expressive number of productions than the other years. Studies with emphasis on the importance of preventive measures in the ICUs for the control of VAP,

decision making for the control and prevention of the disease, and the reduction of the occurrence of diseases are observed.

It should be emphasized that, in terms of objectives, all articles adequately met those of this study and were presented in a way that

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facilitated understanding. It was verified among the sample of articles analyzed, that all discriminated the method used. An overview of the analyzed articles is presented in Figure 1.

Nun		ear	Studied intervention	Result	Conclusion
1	professionals In the Intensive Care Unit on the prevention of pneumonia associated with mechanical ventilation.		is aimed at reducing the primary pathogens to patien mechanical ventilation, colonization of reservoirs pathogens; prevent inocul pulmonary alveoli and assist of the critical patient admit	transmission ofmeasures is fundants submitted toevidence-based recording themeasures are needed by potential quality of care and mation into the in the defenses ted to the ICU.	the patient, so that the treatment of this pathology, besides having a high cost, patient recovery.
2	Pneumonia associated withCarvalho ⁵ 20 mechanical ventilation	006	one of the most feared ad the intensive care setting. in order to apply son	It is noted thatdiagnoses for the id ne therapeuticverified, and it step is thecomplications. The problem. It are few studies	zed that with this study, It is noted that the rapid and accuratemultiprofessional team that works lentification of VAP wasin the ICU has knowledge to avoid could avoid futurethe proliferation of bacteria that cause and/or complicate the VAP. It is reported that there is a need to work together to reduce the risk factors that cause this disease.
3	Pneumonia associated withLima, Di Pace,20 mechanical ventilation:Medeiros, Virgínio 17 prevention and general risk factors	007	It is emphasized that to pathways related to the VAP: aspiration of the content; contamination equipment; transmission from another and hematogonic The retrograde migration of	pathogenesis ofprograms have shown oropharyngealVAP can be reduced of respiratoryvarious interventions m one person toand aspiration of dissemination.contents. It is noted germs from thepathology can be inoculation intoidentification of risk me mechanical ough the spaces the wall of the ons lodge around	If that basic educationIt is reported that knowing the nother that the occurrence ofmain risk factors, facilitates its diby 50% or more using application in the prevention of sto prevent colonizationVAP, since this prevention can secretions and gastric facilitate the rehabilitation of the that the mortality of this patient, since it is known the reduced by these riousness of the involvement of factors and prevention. pneumonia in a patient in an ICU.
4	Pneumonia associated withRodrigues, Carmo 20 mechanical ventilation:Neto, Santos, epidemiology and impact onKnibel ¹⁸ the clinical evolution of patients in an intensive care unit.	009	the main cause of nosocon ICUs, occurring in more than patients undergoing intubation and mechanical	nial infection indiscrepancy in the re n 90% of cases instudies with regard endotrachealmortality. It is kn ventilation (MV).demonstrate simila vance and itspatients with and ventilator-establish VAP as a ris	there is a considerableIt is shown, in light of the esults of epidemiologicalaforementioned authors, that the to theof the VAP forpneumonia caused by mechanical nown that while someventilation was confirmed so that ar survival betweenthis ventilation predisposes the without VAP, otherspatient to this pathology. k factor for death.

		distinct clinical entity within nosocomial pneumonias, representing one of the main
		challenges faced by the intensivist in daily
L		practice.
5	Intervention and proposedSantos, Figueiredo ⁴ 2010 activities for the diagnosis of impaired spontaneous ventilation	It is demonstrated that pneumonialt is noteworthy that a large part of thelt is understood that pneumonia is associated with mechanical ventilation isinfections that affect patients dependent oncaused by bacteria. Thus, the the main cause of death due to hospitalthe ventilatory support is possiblypatient affected by it becomes infection. It is reported that it is necessary preventable since there is an enormous needmore susceptible to other to have a detailed care of the healthto decrease the facilities of external infections and the care with professional where prevention is a decisive infections. hygiene reduces significantly the aggravation of this disease.
6	Pneumonia associated withMoreira, mechanical ventilation:Esquivel, known preventive measures Fernandes ¹¹ by the nurse	It is defined that the knowledge of risklt is verified, according to the properIt is understood that, there are factors for VAP is of fundamental preventive care of pneumonia associated withseveral factors that contribute importance for decision-making in themechanical ventilation, the great importancesignificantly to the contagion of control and prevention of the disease. It isof the health professional in front of thispneumonia associated with shown that the risk factors of VAP are: ageinitiative so that prevention is necessary bothmechanical ventilation. It is above 70 years; with the; level of locally and properly in the patient. necessary a fast and accurate consciousness; tracheal intubation and approach of the health reintubation; immune conditions; use of professionals with the pertinent immunosuppressive drugs; prolonged care to each patient in their bed. mechanical ventilation longer than seven days; condensate aspirated from the fan circuits; malnutrition; exogenous contamination; antibiotic therapy as prophylaxis; microbial colonization.
7	Mechanical ventilation: how Machado, Eder,2011 to start Cynthia, Sérgio ¹⁹	It is noted that the use of invasivelt was verified that the necessity of traininglt should be noted that, according mechanical ventilation and non-invasive nurses for the observation of the possibleto the patient's clinical picture, it ventilation. It is revealed that in bothneed to change the method of mechanicalis possible to perform the exchange situations, artificial ventilation is achieved ventilation. of invasive ventilation for non-invasive ventilation of positive pressure in invasive ventilation, according to the airways. It is assumed that what differs the follow-up of the patient's from one another is the form of pressure improvement. A thorough analysis release: while in the invasive ventilation a prosthesis introduced into the airway is used, that is to say, a tracheostomy cannula, non-invasive ventilation uses a mask as an interface between the patient and the artificial ventilator.
8	Mechanical ventilationCruz, Meneses,2011	
	pneumonia: preventiveSerra, Barbosa ²⁰	three categories: related to the host, thereduced by 50% or more using variousto the consequences for the

	measures	devices and the team. Host factors are interventions to prevent colonization and patient. It has been shown that
		reported to include preexisting conditionsaspiration of secretions and gastric contents.preventive measures considered as
		such as immunosuppression, chronicIt is pointed out that prevention should besimple and adequate within the
		obstructive pulmonary disease, acutepart of VAP management strategies. ICU result in the reduction of this
		respiratory syndrome, level of infection. It is known that this
		consciousness, number of intubations, and contamination occurs mainly
		medications in use. It is noted that device- through external pathogens.
		related risk factors include the
		endotracheal tube, the ventilator circuit,
		and the presence of a nasogastric tube.
		Incorrect hand washing, resulting in cross-
		contamination of patients, is reported to be
		the major risk factor related to the team.
9	Pneumonia associated withSilva, Silvestre,2011	It is shown that risk factors for thelt should be emphasized that preventivelt is noticed that, among the
	mechanical ventilation: riskZocche, Sakae ²¹	development of VAP can be divided intoaction attitudes involve constant handpossible forms of contamination of
	factors	modifiable and non-modifiable. Non-hygiene, maintenance of the patient'sthe pneumonia associated with
		modifiable variables are: age, severityelevated decubitus, care in themechanical ventilation, the
		score at ICU admission, and presence ofadministration of the enteral diet andcontagion of the place is an
		comorbidities. It is emphasized that theadequate techniques of aspiration andalarming factor so that the health
		modifiable factors are related to thetracheal intubation. professional needs to redouble the
		microbiota of the ICU itself, justifying the hygiene of the patient, as well as
		importance of knowing the most frequent the place where it is found.
	22	agents in each specific place.
10		It is determined that pneumonia often t is reported that hand washing is widelylt is emphasized that the most
	mechanical ventilation	results from aspiration of small particulaterecognized as a fundamental preventioneffective preventive measures in
		materials containing microorganisms or ismeasure. It is noted that its practice relation to VAP, among others, are
		consequent to bacteremias originating from interrupts the transmission of bacteria from the washing of the hands and the
		foci distant from infection. It should be patient to patient and is especially effectivelygiene of the materials used in
		noted that intravascular catheters, urinarywhen mucous membranes, respiratorythe patient.
		infections and bacterial translocation cansecretions or objects that have come in
		produce bacteremias and pneumonias. It iscontact with respiratory secretions.
		reported that microorganisms acquired
		during hospitalization are associated with
11	Proumonia associated withSource Pôge Source 2012	higher mortality.
1''	Pneumonia associated withSousa, Rêgo, Sousa,2012 mechanical ventilation:Oliveira, Coelho ¹⁵	It is known that health-care-relatedIt is demonstrated that, due to the incidenceIt is determined that patients in pneumonia is usually of private origin, of pneumonia associated with mechanicalthe ICU are easily affected by
	literature review	where the main source is secretions fromventilation, it was identified that, in additionventilator-associated pneumonia.
	literature review	the upper airways followed by exogenousto internal factors, external factors, Among the most relevant factors
		inoculation of contaminated material. It isespecially contaminated material, contributeare the infected or poorly sanitized
		stated that these aspirations are generallyconsiderably to the aggravation of thismaterials. It is shown that, in this
		stated that these asphiations are generally considerably to the aggravation of thismaterials, it is shown that, in this

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silent, requiring the absolute attention of pathology. way, there is an enormous need for the health professional. hygiene of the materials that will be used in the procedures with these patients. It is reported that, with the advent of t is concluded that, according to the t is reported that constant Recomendations! Barbas. Isola, 2013 mechanicalFarias, Cavalcanti²³ increasingly sophisticated ventilators and analyzes made, it is of paramount importance monitoring of the patient in the Brazilian the possibilities of fine-tuning sensitivity the knowledge and the monitoring of the ICU is especially noteworthy, ventilation companies 2013 and of several triggering mechanisms of patient by the nurse so that it may needespecially if the patient uses the different velocities and inspiratory flowadjustments in the device used. mechanical ventilator. The need acceleration, several inspiratory timeout for nurse monitoring was addressed mechanisms and several monitoring options if there is a need for adjustment or , there is the possibility of adjusting the even immediate intervention. patient's synchrony with the mechanical ventilator and mechanical ventilation according to the respiratory disease presented by the patients. 2014 It is noteworthy that some factors may t is stated that the nurse is responsible for t was identified that by means of Pneumonia associated with Nascimento, mechanical ventilation and Schier, Farias, contribute to the contamination of patientsthe team of Nursing professionals who worksimple preventive with mechanical ventilation and they arein the intensive care center whosepneumonia or even a more serious use of invasive procedures Mantovani, Kalinke²⁴ three times more likely to acquirepermanence in these sectors is prolonged. Apathology within the ICU can be pneumonia. It is said that the ICU'snumber of recommendations for reducing VAPavoided. It is known that it is up to including educationalthe nurse to consolidate these hospitalization and poor oral hygieneare considered, increase the susceptibility. It is definedmeasures for health professionals, measures with the multidisciplinary that the chewing of hard foods, theepidemiological surveillance of hospitalteam. movement of the tongue and the speechinfections, disruption of micro-organism perform a process of natural cleaning of thetransmission through appropriate use of mouth. It is confirmed that the use of somehospital equipment, prevention drugs reduces the salivary flow andtransmission from one person to another, and contributes to the increase of biofilm in themodification of risk factors for the oral cavity contributing to oral colonizationdevelopment of bacterial infections. by respiratory pathogens Nursing care for the patientMelo, It should be pointed out that the significantly is informed that the care taken by thelt is noted that the patient Teixeira,2014 under mechanical ventilationOliveira, number of pneumonias increase associatednursing team to the patient in the MVhospitalized in ICU, when Almeida, admitted to an intensive Veras, Studart¹³ with mechanical ventilation is due in largeadmitted to the ICU. submitted to invasive ventilation. part to the patient's lack of care with the needs qualified assistance. It is care unit patient's oral hygiene. noticed that the nursing team, because it offers continuous care, needs technical and scientific reasoning, to carry out its functions in a satisfactory way,

			contributing to the clinical improvement of the patient
15	Modifiable risk factors forNepomuceno, ventilator-associated Miranda, Nogueira, pneumonia in intensive care Silva, Silva ²⁵	2014	It is stated that the risk factors for thelt is reported that the category that mostlt is shown that VAP, according to onset of VAP can be classified as modifiable presents the risk factors found for thethe authors mentioned above, is an and non-modifiable. It is emphasized thatoccurrence of VAP are inherent to the ICUexclusive pathology of patients in those considered as non-modifiable are:admission itself. age, severity score at ICU admission, and comorbidities, and modifiable factors are related to the ICU's own microbiota and to the four pathways associated with the pathogenesis of VAP: aspiration of oropharyngeal contents; contamination of respiratory equipment; transmission from one person to another.
16	Technologies and advancesVasco, in patient care studies withSilva, Pinheiro ¹⁰ ventilator-associated pneumonia	2015	It is argued that an important source of t should be pointed out that the prevention it is understood that pneumonia infection from mechanical ventilation of pneumonia should occur through the associated with mechanical pneumonia is the pathogen transference implementation of standard precautions, the ventilation can be avoided between patients through healthuse of the antimicrobial prescription protocol considerably by means of the professionals or pathogens that areand, mainly, the reduction of the maximum hygiene procedures performed by characteristic of the equipment used in time of intubation. the health professionals who patients with probe and tubes. attend it, in view of the relevance of the necessary precautions.
17	Pneumonia associated withSantos ²⁶ mechanical ventilation	2015	•
18	Pneumonia associated withRodrigue, Carmo, mechanical ventilation:Santos, Knibel ²⁷ epidemiology and impact on the clinical evolution of patients in an intensive care unit.	2016	

		prevalent in ICUs.	mechanical ventilation.	infection can be housed in the materials used for the treatment.
19	Physiotherapeutic strategiesMoraes, Pereira, in the prevention of Oliveira ²⁸ ventilator-associated pneumonia	prevention of VAP can be divided pharmacological and non-pharmacol but the latter were highlighted due to	res of The oral cavity hygiene strategies m d intooropharyngeal colonization and ogical, performed as the use of antisept o theirhygiene. Among the products and chlorhexidine, an antimicrobial agent broad spectrum of activity against positive (including resistant) microor and with less efficacy against gram-r bacilli.	inimizelt is known that in addition to the weremeasures considered as ic oralpharmacological, measures known used, as non-pharmacological have the with adesired effect and avoid gram-consequent complications of ganisms infections caused mainly by the
20	Incidence of ventilator-Mota, Oliveira,2017 associated pneumonia inSilveira, intensive care unit Oliveira ²⁹	infection in the ICU, but its dia remains challenging. It is known th diagnosis is made when the p develops a new pulmonary infiltrate imaging examination accompanied I	commonit is reported that criteria to diagnosisare necessary because it has a cat thesensitivity, but low specificity, singular contents of the another extrapulmonary infection by the pulmonary infiltrates may be another causes. It is necessary to carry microbiological examinations, by consamples of material from the respiratory tract, by performing quantular cultures in order to establish an adiagnosis.	a highdiagnosis of a VAP is of ce thefundamental importance for the ction orpatient so that once diagnosed, andwith this infection treatment is lue toinitiated immediately so that there nical oris no greater impairment of the out thepatient's health. llecting lower titative

Figure 1. Characterization of the scientific production regarding the risk factors that favor ventilation-associated pneumonia. João Pessoa (PB), Brazil, 2018.

DISCUSSION

It is reported that the selected studies demonstrated a great diversity of pneumonia associated with mechanical ventilation: measures of control and prevention of pneumonia in the ICUs, but this was not the only topic addressed, other issues emerged, such as: origin, diagnostic forms, major sources of infection and classification of risk factors for VAP.

The following thematic categories emerged after the analysis of the publications: Relationship of risk factors in the development of VAP; Definition of preventive measures in the ICUs for the reduction of VAP.

It is evident that these subjects are of paramount importance for all health professionals who live daily with patients who are in the ICUs, since it corroborates the reflection regarding the care to be taken to reduce the occurrence of this pathology.

It is pointed out that the occurrence of hospital infection depends basically on the existence of a source of pathogens, the transmission of the agent and susceptibility of the patient. It should be pointed out that, in order to prevent infections acquired in the hospital, this cycle should be interrupted by having, as support, the detailed attention of the professional.

It is revealed that the main risk factors that trigger pneumonia associated with mechanical ventilation are divided into modifiable and non-modifiable, where the main modifiable factor is age and severity score and, on the other hand, a non-modifiable factor is the microbiota, therefore, in a hospital ICU, it is inevitable the emergence of these microorganisms.¹⁵ It is reported that both are constantly inserted in an ICU, and preventive measures are necessary to reduce them.

With this assumption, ¹⁶ in his article, one of the main ways to contract pneumonia associated with mechanical ventilation is the use of some contaminated equipment, since the patient, in the ICU bed, using ventilation mechanics, is susceptible to several diseases, mainly infectious. It is emphasized that, in this way, the correct use of this equipment, as well as the cleaning thereof, can be a way to prevent infection through existing pathogens in the equipment.

It is reported that the knowledge of the indispensable risk factors of the patient's involvement due to pneumonia associated Fatores de risco que favorecem a pneumonia...

with mechanical ventilation by the health professional is an approach¹¹ in order to demonstrate the importance of care, above all, avoiding the possible causes of complication. It is necessary then that the health professional carries out the necessary precautions for the reduction of risks for the affection of this pathology.

In this sense, one of the most relevant risk factors for pneumonia associated with mechanical ventilation is through infections transmitted by the health care provider, and especially by pathogens in some of the equipment that the patient uses. a direct contamination.¹⁰

It is exposed, through his research, that the lack of care of the nurse related to the hygiene of the patient is considered a more present risk factor in the ICUs of the hospitals, since the hygiene becomes indispensable in the recovery of the patient who makes use of the mechanical ventilator and is affected by pneumonia associated with mechanical ventilation, since hygiene, in addition to preventing diseases, can aid in patient evolution.¹³

However, the health professional's perception about the preventive care of ventilator-associated pneumonia important.⁴ Considering the main risk factors for ventilator-associated pneumonia mentioned above, special attention should be paid in the prevention of them, especially in the hygiene of the patient and the bed, since the patient who uses mechanical ventilation is predisposed to several pathologies that can be avoided, mainly, by means of an intensified hygiene.

It is summarized, according to the authors mentioned above, that the main risk factors that cause ventilator-associated pneumonia are: age; the severity score; the pathogens found in the equipment used by the patient; the lack of hygiene care and the transmission of infection through the health professional. The reduction of these factors is observed through preventive measures.

CONCLUSION

The results of this study are expected to provide support for discussions and new investigations focused on the main factors favoring the emergence of Mechanical Ventilation-Associated Pneumonia.

It is understood that mechanical ventilation is an increasing procedure in the ICU, in contrast, the increase of pathologies caused due to the use of the mechanical

ventilator is also expressive, especially the Mechanical Ventilation-Associated Pneumonia (VAP).

In view of this significant increase, the main risk factors that favor the emergence of this pathology were addressed. It is reported that the chosen articles clearly and objectively describe these factors, addressing the main preventive actions, especially the intensification of patient hygiene, since it was understood that many infections arise from the lack of care with the hygiene of the patient.

inferred is that, despite the importance of the care given to patients on ventilation, many mechanical health professionals do not perform them correctly. Therefore, it was identified the need for specific care for the treatment of this pathology in order to obtain a gradual improvement of the patient.

It is important, in addition to applied care, to educate Nursing teams in the proper handling of the mechanical ventilator or any other equipment present in the intensive environment, so that they are factors that interfere in the prognosis.

It is described, in an article, that a professional can transmit external infections to the patient in the ICU, since the health of the patient is very debilitated.¹¹

However, it is noted that pneumonia associated with mechanical ventilation, although it is an infection that can be avoided by nursing care, few nurses carry out preventive measures. It is reported that the index of this pathology is increasing, mainly due to the lack of specific care for the patient.

It is concluded that, among the main risk factors for pneumonia associated with mechanical ventilation, the most relevant is the inefficient practice or even the lack of hygiene of the patient performed by the health team, considering the existence of innumerable opportunist pathogens that could easily be eliminated through efficient hygiene

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https://doi.org/10.11606/issn.2176-7262.v50i1p39-46

Submission: 2018/03/11 Accepted: 2018/11/08 Publishing: 2018/12/01 Corresponding Address

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