Nursing care in the prevention of ventilator-associated pneumonia in an Intensive Care Unit

Cuidados de enfermagem na prevenção da pneumonia associada à ventilação mecânica em Unidade de Terapia Intensiva

Cuidados de enfermería en la prevención de la neumonía asociada al ventilador en una Unidad de Cuidados Intensivo

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RESUMO

Objetivo: descrever os principais aspectos da importância dos cuidados de enfermagem para prevenção e tratamento da pneumonia associada à ventilação mecânica no contexto da unidade de terapia intensiva, **Método:** Trata-se de uma revisão integrativa da literatura, do tipo exploratório, tendo como período estabelecido para busca de publicações acerca da temática em questão foi de 2010 a 2021. A busca dos estudos ocorreu de dezembro de 2021 a março de 2022 nas bases de dados eletrônicas Scielo e descritores na Literatura Latino-americana e do Caribe em Ciências da Saúde via Biblioteca Virtual em Saúde e na Medical Literature Analysis and Retrieval System Online. **Resultados:** foi possível identificar a importância da assistência de enfermagem para prevenção e controle da pneumonia associada à ventilação, tendo em vista a variedade de ações desenvolvidas por este profissional, o impacto destas na prevenção. **Conclusão:** os cuidados de enfermagem são essenciais para efetividade das ações de controle e prevenção da pneumonia associada à ventilação, com resultados positivos, tendo em vista os riscos envolvidos, e a necessidade de prevenção e terapêutica efetiva.

Descritores: Unidade de Terapia Intensiva; Pneumonia; Ventilação Mecânica.

ABSTRACT

Objective: to describe the main aspects of the importance of nursing care for the prevention and treatment of ventilator pneumonia associated with mechanical ventilation in the context of the intensive care unit, **Method:** This is an integrative review of the literature, of the exploratory type, having as an established period for the search for publications on the theme in question was from 2010 to 2021. The search for the studies took place from December 2021 to March 2022 in the Scielo electronic databases and descriptors in the Latin American and Caribbean Literature on Health Sciences via the Virtual Health Library and the Medical Literature Analysis and Retrieval System Online. **Results:** it was possible to identify the importance of nursing care for prevention and control of ventilator-associated pneumonia, in view of the variety of actions developed by this professional, the impact of these actions on prevention. **Conclusion:** nursing care is essential for the effectiveness of actions to control and prevent ventilatory-associated pneumonia, with positive results, in view of the risks involved, and the need for prevention and effective therapy.

Descriptors: Intensive Care Unit; Pneumonia; Mechanical ventilation.

RESUMEN

Objetivo: describir los principales aspectos de la importancia de los cuidados de enfermería para la prevención y tratamiento de la neumonía ventilatoria asociada a la ventilación mecánica en el contexto de la unidad de cuidados intensivos, **Método:** Se trata de una revisión integradora de la literatura, de tipo exploratorio, teniendo como período establecido para la búsqueda de publicaciones sobre el tema en cuestión fue de 2010 a 2021. La búsqueda de los estudios se realizó desde diciembre de 2021 hasta marzo de 2022 en las bases de datos y descriptores electrónicos Scielo en la Literatura Latinoamericana y del Caribe en Ciencias de la Salud a través de la Biblioteca Virtual en Salud y el Sistema de Análisis y Recuperación de Literatura Médica en Línea. **Resultados:** fue posible identificar la importancia de los cuidados de enfermería para la prevención y control de la neumonía asociada a ventiladores, en vista de la variedad de acciones desarrolladas por este profesional, el impacto de estas acciones en la prevención. **Conclusión:** el cuidado de enfermería es esencial para la efectividad de las acciones de control y prevención de la neumonía asociada ventilatoria, con resultados positivos, en vista de los riesgos involucrados, y la necesidad de prevención y terapia efectiva.

Descriptores: Unidad de Cuidados Intensivos; Neumonía; Ventilación mecánica.

REVIEW

Introduction

Ventilator-Associated Pneumonia (VAP) is one of the most common complications in intensive care units (ICUs) worldwide, since approximately 27% of intubated patients develop VAP 48 hours after intubation, the mortality and lethality rate due to the disease is still very high. Research has shown that between 1% and 3% per day are contaminated by the use of mechanical ventilatory support. Pneumonia associated with mechanical ventilation occurs from contact with the causative agent of pulmonary infection after breaking the protection barrier due to care and/or therapeutic failures. Pneumonia is characterized by being an acute infection of the lungs that produces important respiratory signs and symptoms, whose main route of involvement for microorganisms is the lower respiratory tract. This is related to mechanical ventilation and aspiration of oropharynx secretion, in the case of patients who are using orotracheal tube, and may also be related to secretion that accumulates above the tube balone.[1]

According to data from the Center for Diesease Prevention and Control, Ventilator-Associated Pneumonia (VAP) is the second most common nosocomial infection in the USA, representing 15% of total Healthcare-Related Infections (AIs) and 27% of infections acquired in Intensive Care Units (ICU). There is evidence that VAP has the highest lethality rate and deaths from hospital infection.[2]

The high rate of infection rate by the use of mechanical ventilation in intensive care units is recurrent, exposing patients to the risk of acquiring VAP, especially due to the decrease in defenses of the human body and low immunity due to the levels of infection of the patient and hospitalization. In addition, VAP increases the patient's icu stay, generating high hospital costs and emotional distress to the relatives of hospitalized patients. We can also report the involvements and traumas of the upper airways, since invasive procedures are intrinsically related to the chain of transmission of microorganisms associated with AIS, and may affect such patients at risk. Therefore, VAP is verified as one of the IRAs of epidemiological importance that involves the relationship: pathogen, host and variables related to transmission. Thus, it involves an important concern regarding prevention and control measures.[3]

In view of the above, the nursing team's responsibility for the control and prevention of VAP is considerable, as it contains an important role in care related to the use of mechanical ventilation in the ICU. Considering that the nursing team provides direct and repetitive care to clients, there was a need to better understand this context. And, thus, to be able to contribute to the quality of care offered to the client, ensuring safety to care and knowledge for the elaboration of protocols that will contribute to the better contextualization and support of professionals to the practices of control of VAP in intensive care units.[3]

Based on these assumptions, the following problem arises: what is the importance of nursing team care for the prevention and treatment of ventilator-associated pneumonia in the context of the intensive care unit? Thus, the present study aims to describe the main aspects of the importance of nursing team care for the prevention and treatment of ventilator-associated pneumonia in the context of the intensive care unit.

Method

The proposed study is an integrative literature review, a method used for broad analysis, promoting a solid theoretical basis, which can contribute to discussions on research methods and results, besides highlighting gaps in knowledge that need to be filled with new studies.[4]

The search for the studies took place from December 2021 to March 2022. During this review, the following steps were performed: formulation of the research question, idealization of the strategy and strategies for data collection, extraction of relevant data from the reviewed studies and, finally, analysis and interpretation of the data. The PICO strategy was used to develop the northern question (P - patient on mechanical ventilation, I- intervention: nursing care, Co - context: pneumonia prevention). This was defined as: How does the literature address nursing care in the prevention of pneumonia caused by mechanical ventilation? After determining the objective of the study, a search was performed by authors in a database of Descriptors in Health Sciences, and the following themes were chosen: Pneumonia; Mechanical Ventilation; Prevention and Control; ICU and Nursing, with its variations in English: Pneumonia, Ventilator-Associated; Prevention; Control; Nursing; and Spanish: Neumona; Mechanical Ventilation; Prevention; Control; Infirmary.

There was extreme rigor of evaluation to the selection process of the articles. The systems of key databases in the health area were used to perform the selection of studies. Research was conducted in Latin American and Caribbean Literature on Sade Sciences (LILACS) via the Virtual Library in Sade (VHL) and in the Medical Literature Analysis and Retrieval System Online (MEDLINE/ PUBMED) of relevant articles. After the search phase, the original articles were chosen based on the review of titles and abstracts, as well as the following inclusion criteria.

After the inclusion of these selected articles that were published in journals between 2010 and 2021, with the objective of identifying what is currently being published on the subject in national and international journals made available in their entirety (full and free text), the full text of each article was read to select the studies that answered the research question. All publications addressed adult general ICU and other relevant hospital sectors that fit the research problem, conducting the search for articles that had to do with the proposed theme. Those articles that were insufficient were discarded. From December 2021 to March 2022, a survey was conducted, obtaining 35 studies from the VHL database and 52 from Medline, totaling 87 publications. In this stage, the availability of data from the reading of 87 publications, 24 publications were elected for this research, to abstracts of titles and availability of data,13 abstracts, at the end of the selection of VHL data and 11- in Medline.

Selections of articles were made using criteria for analysis of the studies, and those that contributed to the resolution of the thematic question were selected. After the evaluation of the texts in full, a descriptive analysis of the results evidenced was performed, in which a synthesis of each study included in the review was presented, as well as the differences between the studies.

Results and Discussion

Patient on mechanical ventilation within the ICU

Mechanical ventilation consists of a supportive method used for the treatment of patients with acute or chronic respiratory failure. It aims to maintain blood gases in order to ensure tissue oxygenation, without risk of severe respiratory acidosis. In addition, it avoids induced injury, and serves to relieve the load on the respiratory musculature.[5]

The patient on mechanical ventilation may have his stay in prolonged hospitalization, since he is exposed to a series of invasive procedures, with a high number of people who take care of his care, being very exposed also to infections and other complications, quite susceptible to VAP.

With regard to mechanical ventilation, the patient is usually in a state of physiological stress due to the severity of his clinical condition, which is responsible for generating a series of disorders, which implies the need for care that takes into account its specificities involved, as advanced weaning modes in order to prevent any type of complication stemming from its use, taking into account the peculiarities involved.[6-7]

Despite advances in the intensive care unit (ICU) and mechanical ventilation, the incidence of pneumonia in this context is high, with an occurrence ranging from 9% to 27%, and has a mortality rate ranging from 25% to 50%.

Nurses need to recognize the complications arising from mechanical ventilation, given their severity and the need for rapid and effective care, increasing the chance of a promising prognosis, because it decreases the possibility of injury, because the patient needs to have the objective conditions for a positive rehabilitation process in the ICU

Based on the need for monitoring, nurses need to know the pathophysiology of respiratory infections, the main characteristics of mechanical ventilation, so that monitoring fulfills its functions, so necessary for the positive prognosis of the patient, because without proper knowledge, care may not meet the needs, in view of the complexity and risks involved in this process.[8]

Mechanical ventilation is essential for the patient, since it effectively contributes to the rehabilitation process of the patient in the ICU, taking into account the specificities involved, which is a consensual point in the literature on this topic.[8]

Morbidity, comorbidity, prevalence and prevention of VAP

VAP can contribute to the severity of the patient's disease, also resulting in organ failure and specificities of the population, taking into account the etiological agent involved. In addition to mortality, the impact of this infection translates into prolonged hospitalization.[9]

In this sense, it is worth noting that the pathogenesis is directly linked to health care, because it involves the interaction between pathogen, host and epidemiological variables that serve to facilitate this dynamic.

Thus, the mechanisms contribute to the occurrence of these infections, because the role of each of these factors remains controversial, and may vary according to the population involved, taking into account the etiological agent.[7]

In addition, VAP within the ICU is among 85% of nosocomyal pneumonia, with rates ranging from 9 to 40% of infections, and are associated with an increase in hospitalization period, as well as in morbidity and mortality rates.[5]

From this perspective, VAP is one of the most important complications in ICUs, which implies the proper implementation of preventive measures, as well as in control and treatment, considering that it can significantly aggravate the patient's clinical picture. Given the high rate of VAP in the context of the ICU with influence on morbidity and mortality, it is necessary to take into account not only this type of complication, but the need to develop preventive actions and, in case of occurrence, early treatment, considering its particularities.[10]

Thus, it is up to nurses to act in the prevention of VAP, taking into account mechanical ventilation, as a form of preventive measure we can highlight the early weaning of mechanical ventilation.[7]

Early weaning from mechanical ventilation as prevention of VAP

A mechanical ventilation in support pressure is a partial ventilatory mode that is used to facilitate weaning from mechanical ventilation, enabling the gradual reduction of ventilatory support and the gradual increase of the load that is being assumed by the patient, despite its use, the adjustment of the pressure support level remains a challenge, as it is based on subjective criteria of the observer, which makes it difficult to establish promising criteria.11 This is because the use of noninvasive parameters measured punctually such as minute ventilation, tidal volume, respiratory rate, vital capacity, rapid and superficial breathing index, use of accessory inspiratory muscles and patient comfort did not show good accuracy to adjust the level of support pressure.[12]

In artificial ventilation, weaning is a complex process, which requires evaluation and interpretation of the patient's clinical parameters, both objectively and subjectively.

In this context, it is possible to take into account that the delay in the weaning process can expose the patient to unnecessary discomfort, increase the risk of complications and costs.[11]

It should be noted that automated weaning modes can accelerate extubation and decrease the workload of the health team. However, automatic weaning modes have not been compared to each other, nor systematically evaluated under specific, more common conditions, such as extreme anxiety or unsatisfactory inspiratory efforts.[9]

Automatic weaning is marketed in several systems, each having the algorithm proposed by its manufacturer. The MRV® (Mandatory Rate Ventilation-Taema) system proposes the adjustment of the support pressure through the use of a target respiratory frequency. While the ASV® (Adaptive Support Ventilation- Hamilton) system is based on adjusting the support pressure in order to maintain optimal minute ventilation. Smartcare® (Draeger) uses the relationship between respiratory rate and etCO2 level and tidal volume to classify the patient and perform the titration of the support pressure.[13]

Automatic means are useful, demonstrating the reduction of the weaning time of mechanical ventilation when compared to manual adjustment. This is because the automatic adjustment is able to keep the patient longer in the parameters of normality and respiratory rate than the adjustment made by the doctor.[14]

The advanced modes of weaning from mechanical respiration are of fundamental importance for the patient's health and have occurred with some frequency, presenting several clinical problems. It is because of this that the

evaluation and initial measures of patient care should be taken with extreme care, seeking to effect the weaning process in a promising way, given the importance of this factor for the prognosis of the patient.10 In addition, the use of non-invasive parameters measured, such as ventilation, tidal volume, respiratory rate, vital capacity, breathing index, use of accessory inspiratory musculature and patient comfort are elements that are part of the evaluation to adjust the level of the support pressure.[11]

Another aspect highlighted was about the adjustment of the level of pressure support that remains a challenge because it is based on several criteria, even though it is a widely debated and already old theme, because, to a large part, this adjustment depends on subjective criteria and the observer.[15]

Regarding the advances obtained by the automatic modes of weaning of ventilatory respiration, and, despite the various brands available on the market, there is still a need for more detailed studies on these modes, in order to evaluate epidemiological samples, to the point of establishing parameters for their use, in addition to a specific protocol of assistance for weaning.[5]

Despite the importance of ventilatory weaning and the essentiality of care for the patient's prognosis, there is no clarity as to the systematization and effectiveness of the mode and that a specific protocol can be performed, since several studies adopt only generic measures, with difference between them.

In addition, there are no physiological data that make it possible to ensure the success of ventilatory weaning, because even in the automatic means there are divergences of tests about its effectiveness. In this sense, the care developed by nurses needs to focus primarily on the care in the biological, psychological and clinical aspects of patients on mechanical ventilation in the ICU, which is usually in a difficult situation, with the effectiveness of actions being an essential role, avoiding complications, reintubation, and respiratory infections, as well as with regard to VAP.[8]

The role of nurses and nursing care in patients susceptible to VAP

People who need the use of Mechanical Ventilation (MV) in an Intensive Care Unit are very frequent in ICUs. Ventilator-associated pneumonia (VAP) is considered the second disease with higher rates, with regard to nosocomial infection in ventilated patients. VAP in addition to disease is also considered an important marker of the quality of health care because it is a disease subject to prevention.[16]

According to Moraes, Pereira and Oliveira (2016) pneumonia in the icu context is related to health care, being generally of aspirational origin, being the main source, the secretions of the upper airways, followed by exogenous inoculation of contaminated material or reflux of the gastrointestinal tract. These aspirations are, more commonly, silent microaspirations, there are rarely macroaspirations, which when they happen bring a picture of severe and rapidly progressive respiratory failure. In addition, it should be noted that pneumonia is rarely the result of hematogenous dissemination, taking into account the infectious focus at a distance.

Because of this, the care of patients with VAP needs to be treated from the focus of morbidity and mortality. Thus, nurses need to act taking into account the Bundle related to ventilation, taking into account not only prevention, but also control, and the therapy adopted.[13]

Nursing plays a critical role in the implementation of protocols and prevention measures for VAP. Pneumonia is the second most common hospital infection in intensive care units. When it comes to mechanical ventilation, this is the infection that most affects hospitalized patients, with an incidence ranging from 9% to 68%, depending on the diagnostic method used and the population studied. There are several risk factors for VAP, and they may vary by institution, TYPE of ITU and the public studied. Proves the need for permanent local prevention and specific measures to control these adverse events.[17]

The implementation of bundle in the prevention of VAP consists of performing the conducts that act in reducing the risks inherent to the procedure, taking into account the clinical picture of the patient within the ICU.[13]

This implies the need to bundle, so that the set of practices is performed collectively, increasing the effective possibility of the actions developed, especially with regard to the prevention, control and treatment of pneumonia within the ICU.[18]

The adoption of good practices is related to the decrease in the occurrence of VAP within the ICU, which implies the relevance of the implementation of the Bundle directed to the patient on mechanical ventilation in the icu context, being essential for the maintenance of the patient's clinical stability, and for a promising prognosis.[9]

Somado a isso, o enfermeiro precisa atuar na prevenção de complicações causadas pelas hiperinsuflação do balonete, levando em consideração a estenose traqueal, traqueomalácea, bem como fístulas gastroesofágicas, pois são essenciais para segurança do paciente.[19]

In this sense, strict cuff pressure monitoring needs to be performed between two and three times a day in all patients with artificial airway, considering that it is a fundamental measure to minimize microaspirations of subglottic secretions, with a view to reducing the risk of VAP.[5]

The oral cavity hygiene strategy contributes promisingly to minimize oromylle colonization, as well as the use of antiseptics in oral hygiene, among other products used as chlorhexidine. The antimicrobial agent with a broad spectrum of activity against gram-positive microorganisms, which also include resistant ones, but with the lowest efficacy against gram-negative bacilli.[14]

Another measure that can be performed by the nurse is the positioning in the bed, keeping the headboard elevated at 30º and 45º in patients with low level of consciousness, taking into account mechanical ventilation. Another important measure for the prevention of VAP is the enteral diet.[20]

This simple practice conduct favors better adaptation to mechanical ventilation, as well as the improvement of gas exchange, reducing the risk of atelectasis and greater ease of weaning. In addition, it favors the cardiovascular system, preventing postural hypotension, helping to improve the patient's alertness.[5]

Therefore, health institutions need to provide the necessary conditions for the health team to develop the control and treatment measures of patients with VAP in the ICU, so that the Bundle can be effectively performed. In addition, continuing education needs to be promoted taking into account the epidemiology surveillance of hospital infections, the interruption of microorganisms by the appropriate use of equipment within the ICU, the prevention of transmission from one person to another, as well as the modification of risk factors for the development of bacterial infections.[21]

It is noteworthy that in the interruption of sedation the nurse needs to interact with the patient, in order to perform the neurofunctional and musculoskeletal evaluation, progressing with early mobilizations. In addition, there is an improvement in the patient's peripheral and respiratory muscle strength, as well as the favoring of its functionality and, consequently, the quality of life after discharge from the ICU, so that the patient can maintain or recover the patient's ventilatory autonomy function, reducing the risks of VAP.[20]

Nurses need to develop their duties taking into account aspects of the patient's health status in the ICU, as well as the peculiarities involved, so that they can promote humanized care, helping in all ways in their therapeutic process, taking the correct measures against respiratory infections and other complications that the patient undermechanical ventilation is subject, contributing to the implementation of Blunde.[22]

The bundle is a group of good practices when implemented together, and serve to reduce the incidence of adverse events, as in the case in question, in the context of the ICU, especially with regard to VAP, in view of the occurrence being high, because applying protocols in care practice is a real challenge.[22]

Therefore, bundles should be used more because they are more dynamic, applied together with the entire health team. In addition, they allow continuous evaluation and the creation of clear therapeutic goals, since they bring together a small group of implanted interventions. As a result, there are substantial improvements in preventive and health care actions.[23]

It is worth noting that the choice of bundle needs to take into account the cost, ease of implementation, adherence of the health team to the measures, so that it can perform its functions effectively, with promising results.[5] In this sense, nurses also need to act both in the implementation of the bundle and also in the prevention and treatment of patients with VAP in the icu context, taking into account the increased risks to the patient, in view of the high morbidity and mortality, in addition to the increase in hospitalization time. The implementation of the bundle is essential for daily suspension of sedation, weaning and early mobilization, since the longer the time of mechanical ventilation, the greater the risk of developing VAP. Thus, it is necessary to accelerate the weaning process, associated with interruptions of sedation so that nurses can also evaluate the possibility of spontaneous breathing,

evolving with weaning. This is because sedation should be restarted when there are risks to the patient, such as ventilatory asynchrony, psychomotor agitation, and accidental extubation.[11]

Thus, nurses need to develop their duties in order to maintain the patient's vital signs, so that they have a greater possibility of survival, considering their needs and the implications involved, while also looking at the severity of the clinical situation, and the specificities of mechanical ventilation and susceptibility of the patient to VAP.[12]

For this, nurses need proper training in order to develop their duties in the shortest possible time, since ICU care needs to have a high degree of resolution, as this is the only way to contribute to a promising prognosis of patients with mechanical ventilation.[5]

The measures for the care of patients diagnosed with VAP involve effective care in order to promote the circulation of oxygenated blood to the heart, brain and other vital organs, since it is essential for the maintenance of life, increasing the patient's chances. This is because the patient on mechanical ventilation is usually in a difficult situation, and needs to receive all care in order to promote the circulation of oxygenated blood to the heart, brain and other vital organs, so that the patient is effectively revived, avoiding the worsening of the situation.[24]

From this perspective, nurses need to implement all the actions necessary for resuscitation. In addition, it is necessary to organize the environment in which care occurs, so that all available resources can be effected in a positive way, so that care can achieve its purposes, because effectiveness is of fundamental importance for patient survival.[11]

It is necessary to evaluate the state of consciousness of the victim, in order to identify if she has lesions, if she responds to stimuli frequently, trying to do everything possible to help her. Then, the area should permeate, tilting the head back with elevation of the jaw, touching the ear to the victim's mouth, observing the movements of the chest, listening to the sounds of breathing and the breath in the ear, for ten seconds. In the case of the victim's breathing, it should be placed in a safe lateral position, in case of not breathing, it should be slowly blow to the elevation of the chest, making the second insufflation after the chest is completely relaxed.[25]

It is also necessary to evaluate the signs of circulation in order to verify the pulse, looking for normal breathing, cough or movements. Soon after, it is also necessary to look for the wrist in the neck, not taking more than ten seconds. If the victim shows signs of circulation, but without breathing, ventilations should be continued, always reassessing the signs of circulation. In case of absence of circulation, it is necessary to perform thirty compressions depressing the chest and two insufflations after each cycle of compressions.[15]

This is because patient care in this context is urgent, and it is up to the health team professionals to act in the process of

restoration of ventilation and spontaneous circulation in order to modify the clinical situation, providing better conditions for survival and prevention of sequelae, considering the severity of the situation and the risks of morbidity and mortality of each patient, as well as the risks they are subject to in the ICU.[19]

In addition, the recognition of possible complications of the patient on mechanical ventilation is essential for clinical stabilization, enabling a positive prognosis for the patient, because the restoration of physiological functions, such as the clearance of the pathways areas, cardiac resuscitation, are interventions performed by the nurse, are vital for patient improvement. Therefore, it is evident the need for prudence, security and objective knowledge about the necessary actions in this context, because effectiveness is essential.[21]

The nurse also needs to maintain tranquility, balance, in order to organize all ventilation maneuvers, artificial circulation, as well as other necessary procedures and equipment without any kind of confusion and impairment of care quality, because care must meet all the needs of the patient on mechanical ventilation in the ICU, increasing the chance and possibility of rehabilitation of the patient.[13]

This is because patient monitoring is responsible for the prevention of injuries, reduction of risks, because it allows the early identification of any type of complication, enabling greater chances for treatment, in view of the intervention performed in the shortest possible time to meet the needs, and also to seek alternatives for care that are not being satisfactory, because any intervention carried out needs to achieve the established objectives, since the morbidity and mortality rate is high.[10]

Final Considerations

Throughout this study, it was possible to identify the importance of nursing care in the care of patients on mechanical ventilation within the ICU, as it contributes both to the effectiveness of the procedure performed, as well as to the prevention of respiratory diseases and infections, taking into account the clinical picture presented by the patient, which is usually severe, and the specificities involved.

It was possible to verify the lack of better standardization regarding the measures taken during patient care and more epidemiological studies on the weaning process. Hence, there is a need for greater dissemination about advanced weaning media, in order to improve the training of health professionals, in order to reduce the risks involved for the patient due to mechanical ventilation.

In addition, the incidence of VAP within the ICU is high, with a strong impact on morbidity and mortality, resulting in longer hospitalization, increased costs, which implies, as explained, the

need for effective measures in the prevention, control and treatment of VAP.

Given the above throughout this study, the importance of nurses in the prevention of VAP, and the effectiveness of the Bundle both in prevention, as well as in control and treatment, with positive results for the patient, promoting clinical stability and risk reduction.

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