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Nursing actions in the prevention of mechanical ventilation associated pneumonia: An integrative review

pneumonia

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RESUMO | OBJETIVO: Objetivou-se identificar medidas de prevenção realizadas pela equipe de enfermagem para prevenir pneumonia associada à ventilação mecânica. MÉTODO: Trata-se de revisão integrativa da literatura norteada pela questão: quais as medidas de prevenção de pneumonia associada à ventilação mecânica utilizadas na assistência de enfermagem ao paciente adulto? A busca foi realizada durante o mês de dezembro de 2020, sem recorte temporal,nas bases: Cumulative Index toNursingandAllied Health Literature; Web of Science; Base de Dados em Enfermagem; Literatura Latino-Americana e do Caribe em Ciências da Saúde. Utilizando os Descritores em Ciências da Saúde: "Pneumonia associada à ventilação mecânica"; "Cuidados de enfermagem"; "Pacote de assistência ao paciente". RESULTADOS:Encontrou-se 1.864 estudos, desses 16 compuseram a amostra final. As medidas mais utilizadas são: elevação da cabeceira do leito, higiene oral e reajuste diário do nível de sedação.CONCLUSÃO:São medidas de baixo custo financeiro e que se mostraram eficazes na prevenção direta.
Descritores: Enfermagem; Pneumonia associada à ventilação mecânica; Cuidados de enfermagem; Pacote de assistência ao paciente.

ABSTRACT | OBJECTIVE: Objective to identify preventive measures carried out by the nursing team to prevent pneumonia associated with mechanical ventilation. METHOD: This is an integrative review of the literature focused on the question: what are the preventive measures for pneumonia associated with mechanical ventilation used in nursing care of adult patients? The search was carried out during the month of December 2020, in the bases: Cumulative Index to Nursing and Allied Health Literature; Web of Science; Database in Sickness; Latin American and Caribbean Literature in Health Sciences. Using the Describers in Health Sciences: "Pneumonia associated with mechanical ventilation"; "Sick care"; "Pacote of assistance to the patient". RESULTS: 1,864 studies were found, 16 of which were composed in the final sample. The most used measures are: elevation of the head of the bed, oral hygiene and daily readjustment of the level of sedation. CONCLUSION: There are low financial cost measures that will be effective in direct prevention.
Keywords: Nursing; Pneumonia associated with mechanical ventilation; nursing care; Patient assistance package.

RESUMEN | OBJETIVO: Objetivou-se identificar medidas de prevenção realizadas pela equipo de enfermagem para prevenir pneumonia associada à ventilación mecânica. MÉTODO: Trata-se de revisão integrativa da literatura norteada pela questão: ¿cuálessonlas medidas de prevención de neumoníaasociada a laventilaciónmecánica utilizada enlaasistencia de enfermagem ao paciente adulto? Una búsqueda realizada durante o más de diciembre de 2020, nas bases: Cumulative Index toNursingandAllied Health Literature; Web de laCiencia; Base de Dados en Enfermagem; Literatura Latino-Americana e do Caribe em Ciências da Saúde. Utilizando os Descritores em Ciências da Saúde: "Pneumonia associada à ventilação mecânica"; "Cuidados de enfermagem"; "Paquete de asistencia al paciente". RESULTADOS: Encontrou-se 1.864 estudos, desses 16 compuseram a amostra final. Las medidas más utilizadas son: elevação da cabeceira do leito, higiene oral y reajuste diário do nível de sedação. CONCLUSÃO: São medidas de baixo custo financeiro e que se muestraneficaces na prevenção direta.
Palabras claves: Enfermagem; Neumoníaasociada a ventilaciónmecánica; Cuidados de enfermagem; Paquete de asistencia al paciente.

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INTRODUCTION

Mechanical ventilation (MV) is an essential component for the survival of patients who are in critical situations. However, the use of the device carries risks, such as healthcare-associated infections (HAI), especially ventilator-associated pneumonia (VAP). [1-2]

HAIs are infections acquired during the care process in health care units. Usually of silent onset, they can be fatal for immunocompromised patients, in addition to implying a longer hospital stay and higher costs. This class of infections is considered to have preventable causes and represents a failure with regard to patient safety. [2]

Among the HAIs, VAP stands out due to its high incidence and its serious consequences. It is defined as pneumonia linked to invasive mechanical ventilation that occurs after 48 hours of intubation, being early when it occurs until the fourth day of MV use and late after the fifth day. It affects about 25% of patients on MV and is caused by bacteria that are multi-resistant to antibiotics. [3-4]

The concern related to VAP is due to the high mortality rate of affected patients, which reaches approximately 33% as a direct result of the infection. Regarding global mortality, the numbers vary from 20 to 60% of cases, according to the severity of the underlying disease and other factors such as the length of stay on MV. [3]

VAP prevention is a challenge for health services. The implementation of good practices in the care of people hospitalized in the intensive care unit is an essential factor for reducing the incidence of HAIs, the length of stay in the ICU and the injuries it may entail, in addition to being a means of promoting patient safety. [5-6]

The role of nurses is directly linked to the provision of care, including such preventive measures. Generally, the identification of signs and symptoms of pneumonia cases in the ICU is performed by the nursing team, and the necessary care is promptly initiated. [7-8]

The motivation for carrying out this research is to identify the importance of quality health care provided by nurses, in order to implement good practices and recommendations from national and international regulatory bodies.

Therefore, the study aimed to identify the preventive measures carried out by the nursing team to prevent pneumonia associated with mechanical ventilation. In this perspective, the research question used was: What are the measures to prevent pneumonia associated with mechanical ventilation used in nursing care for adult patients?

METHOD

This is an integrative literature review, in which it is possible to obtain tools for evidence-based practice. Assimilating six essential steps: 1) Recognition of the research question; 2) Implementation of criteria for compiling studies; 3) Definition of the knowledge to be extracted from the studies; 4) Classification of selected studies; 5) Interpretation of results; 6) Summary presentation of the review. [9]

For the elaboration of the research question, the PVO strategy was used (P = population; V= variable; O= outcome) in which: P = adult patient using mechanical ventilation; V = nursing care; and O = occurrence or not of ventilator-associated pneumonia.

Inclusion criteria were: scientific research dealing with measures to prevent ventilator-associated pneumonia published in English, Portuguese and Spanish. And, the exclusions were studies such as theses, dissertations, monographs, experience reports, editorials, letters to the editor, and review studies. In addition, duplicate studies and those that did not correspond to the objective after reading in full were also excluded. It is worth noting that there was no establishment of a temporal cut in the inclusion of articles, in order to obtain the largest number of studies.

Data collection was carried out in a paired manner, in December 2020, through the journals portal of the Coordination for the Improvement of Higher Education Personnel (CAPES), in the following databases: Cumulative Index to Nursing and Allied Health Literature(CINAHL) via EBSCO Information Services; Web of Science (WoS); Base de Dados em Enfermagem (BDENF); Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS).

To carry out the search, the controlled descriptors of the types Medical Subject Headings (MeSH) and Descriptors in Health Sciences (DeCS), namely: "Nursing care (Cuidados de enfermagem)"; "Pneumonia associated with mechanical ventilation (Pneumonia associada à ventilação mecânica)"; "Patient care package (Pacote de assistência ao paciente)". It occurred in an advanced way, using three search strategies in each base, mediated by the Boolean operator AND.

Initially, 1,864 studies were identified in the four databases used; 486 in CINAHL, 1,356 in WoS, 10 in BDENF and 12 in LILACS. Subsequently, the screening process began, and the studies were submitted to the analysis of the subject by reading the title and abstract, excluding the repeated and duplicated ones. With this, 294 were selected for reading in full, being then evaluated through the inclusion and exclusion criteria. Upon reading in full, 16 studies were defined as the review sample.

For a detailed demonstration of the search and selection process of the studies, the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) flowchart was used, [10] described in figure 1.

To ensure the quality of these steps, double checking was used by the researchers in order to avoid selection bias.

For data collection, an instrument was developed that includes the characterization of the studies selected for analysis, namely: title, author, year, database, journal and objective; methodological aspects: approach, type of study, location, participants, setting, instrument for

data collection, data analysis; and ethical aspects. Finally, the data referring to the research question.

In view of the data extraction, the analysis phase began using the data reduction method, which consists of the steps of ordering, coding, categorizing and summarizing. [11]

As a first step, the primary sources were divided into subgroups, structured according to VAP prevention measures. In the second moment, the technique of extracting data from primary sources and displaying the data was performed in order to gather the sample information around specific variables. Subsequently, the data were compared, involving an interactive process to analyze the views, in order to identify patterns. [11]

From the organization of the results found in the sample, two tables were built with the aid of the computer program Microsoft Word 2019 containing the analyzed information.

RESULTS

Sixteen studies were analyzed whose data regarding authorship, year of publication, database, place of study and methods are summarized in table 01.

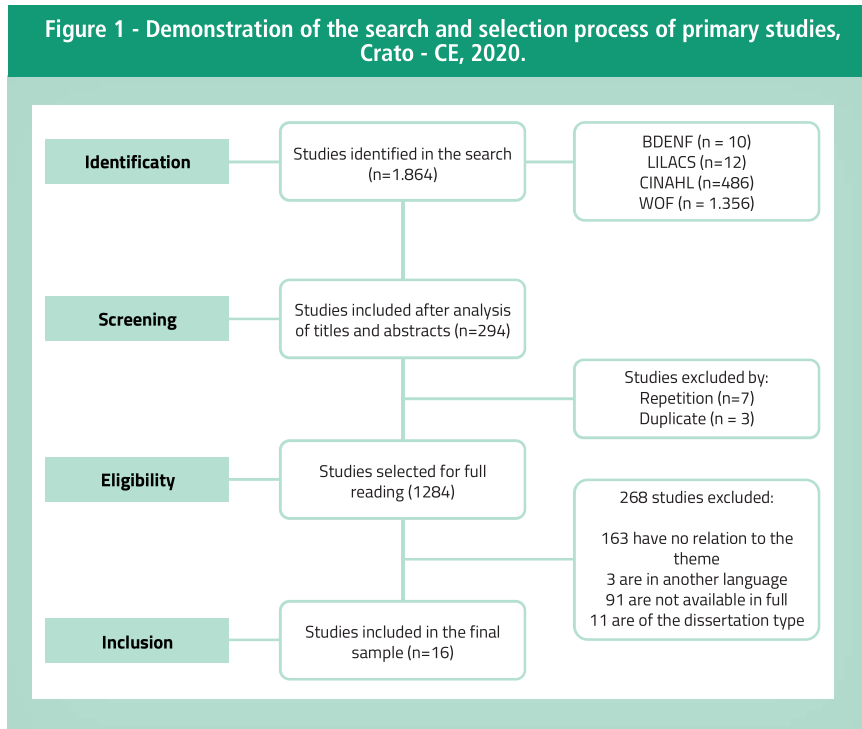Then, there was also a synthesis of measures to prevent pneumonia related to mechanical ventilation and evidence

from the studies that made up the sample of the integrative review, presented in table 03.

DISCUSSION

Most studies used a set of preventive measures, including three to eight measures, a finding that converges with a review study carried out in 2019 with a quantitatively similar sample, in which only 39.1% of its total sample used three to five preventive measures together. [5]

The most used preventive measures, respectively, were: elevated headboard between 30°-45°, oral hygiene with

Figure 1 - Demonstration of the search and selection process of primary studies, Crato - CE, 2020.

Source: PRISMA adapted from Moher et al. (2015)

Table 01 - Characterization of studies regarding identification data, Crato, CE, 2020.			
AUTHOR / YEAR	**LOCATION**	**JOURNAL/ DATABASES**	**METHODS**
1. Lourençone[12]	Porto Alegre, RS – Brazil	Revista de Epidemiologia e Controle de Infecção/ WOS	Observational, longitudinal study. Sample of 154 patients admitted to the ICU using MV.
2. Reper[13]	Bélgica	Public Health/ WOS	Quantitative study. Sample by electronic data collection from 49 hospitals.
3. DeLuca Jr[14]	Arizona – U.S.A.	American Journal of Infection Control/ WOS	Cohort study, quantitative. Retrospective to identify the rate of VAP in the emergency department, with 387 patients. Prospective after the implementation of a VAP prevention package with 152 patients.
4. Samra; Sherif;Elokda[15]	Egypt	Egyptian Journal of Chest Diseases and Tuberculosis/ WOS	Retrospective study with a sample of 130 patients, and a prospective study with a sample of 250 patients admitted to the ICU.
5. Hassankhani[16]	Azerbaijan	Journal of Clinical and Diagnostic Research/ WOS	Prospective randomized single-blind clinical trial, with a sample of 25 patients admitted to the ICU using MV.
6. Sahni[17]	India	Indian Journal of Critical Care Medicine/ WOS	A qualitative, observational, prospective study carried out in an ICU of a tertiary hospital with 12 beds.

7. Chacko[18]	India	British Journal of Nursing/ CINAHL	Prospective, randomized, 'double-blind' study. Performed in a medical ICU with 24 beds.
8. Alcan; Korkmaz[19]	Izmir – Turkey	American Journal of Infection Control/ WOS	Quasi-experimental study, through observation, without interference, by routine daily round, with 128 patients admitted to the ICU.
9. Sen[20]	California – U.S.A.	Journal of Burn Care & Research/ WOS	Retrospective, quantitative and comparative pre-implantation and post-implantation VAP prevention package. Sample composed of all burned adults using MV..
10. Grassie[21]	Yenimahalle – Turkey	Journal of the Turkisih Society of Intensive Care/ WOS	Comparative experimental study carried out in a mixed ICU with 15 beds.
11. Nobahar[22]	Iran	The Brazilian Journal of Infectious Diseases/ WOS	Randomized clinical trial, performed with 68 patients.
12. Mogyoródi[23]	Budapest -Hungary	Interventional Medicine & Applied Science/ WOS	Prospective observational study carried out in a multidisciplinary ICU with 12 beds.
13. Rodrigues[24]	Fortaleza, CE –Brazil	Revista Brasileira de Enfermagem / LILACS	Retrospective, descriptive longitudinal study with a quantitative approach. Performed with 26 patients admitted to the ICU.
14. Parisi[25]	Athens – Greece	CriticalCare Nurse/CINAHL	Prospective intervention study consisting of three phases, pre-intervention, intervention and post-intervention carried out in an ICU with 30 beds.
15. Shitrit[26]	Israel	Journal of the American Geriatrics Society – JAGS/WOS	Comparative non-randomized cohort study of before and after implementation of a modified VAP prevention package. Sample composed of 23 patients from a long-term geriatric center.
16. Stone Jr.[27]	U.S.A.	Surgical Infections/ WOS	A quasi-experimental study carried out in an ICU with 12 beds.

Source: prepared by the authors, 2020.

Table 03 - Summary of measures to prevent pneumonia related to mechanical ventilation and evidence from the studies, Crato, CE, 2020.

OBJECTIVE	VAP PREVENTION MEASURES	EVIDENCE PRESENTED
1. Evaluate the rate of adherence of the nursing team's preventive actions for VAP, after the restructuring and application of the prevention protocol and verify the incidence density rates of patients with VAP.	-Oral hygiene with 0.12% chlorhexidine; -Headboard raised at an angle of 30 to 45°; - Cuff pressure 18 to 22 mmHg or 25 to 30 cmH2O; -Fan circuit filter positioned above its tube insert and free of mess.	The VAP incidence density rate in the ICU of this study was lower compared to the others in the same municipality. Surveillance and continuous reinforcement of the nursing team to carry out preventive measures reached adherence rates above 77%, simultaneously with a decrease in VAP.
2. Verify that implementing evidence-based practices as a package was feasible, influences compliance and could reduce VAP rates.	-Elevation of the head of the bed; -Oral hygiene (with chlorhexidine gluconate proposed as the treatment of choice); -Daily awakening from sedation and assessment for weaning; -Measurement of correct cuff pressure.	The VAP incidence rate increased from 8.34 to 4.78 occurrences/1000 ventilation days. The systematic implementation of initiatives to reduce HAI proved to be feasible and, in fact, led to better implementation and adherence to the bundle application.
3. Assess the prevalence of VAP in patients intubated in the emergency department, the feasibility of its prevention, and the effect on rates.	- Elevation of the head of the bed to 30°-45°; - Oral hygiene every 2 hours; -Subglottic aspiration; -Sedation titration (bolus, drip adjustments or Richmond Agitation Sedation scale documentation); -Daily awakening from sedation and spontaneous breathing tests; - Deep vein thrombosis (DVT) prophylaxis; - Stress ulcer prophylaxis.	VAP prevention measures appeared to reduce rates in this single-center study. The overall mortality rate was 32% for the PRE1 cohort, 26% for the PRE2 cohort, and 25% for the post-intervention cohort.
4. Estimate the microbiology including: VAP rate and attributable mortality among critically ill patients, and evaluate the effectiveness of adherence to the VAP prevention package in eliminating infection, also cost-effectiveness as a reflection of length of stay in the ICU.	- Bed elevation greater than 30° to 45°; - DVT prophylaxis; - Prophylaxis of peptic ulcer (H2 blocker); - Oral hygiene with chlorhexidine (15 ml twice a day until 24 h after extubation); -Daily awakening from sedation and assessment for weaning.	The mortality rate was 38% in the group without application of the prevention package and 30% in the group with application of it. The difference in ICU length of stay was 5% lower for the group using the prevention package. And, the reduction of almost two days in hospitalization time. Consequently, reduction of financial costs and human resources of 2 to 3 thousand dollars per case.

5. Examine the effect of the 60° position on VAP prevention and respiratory parameters in mechanically ventilated patients.	-Fixed on patients' bed to keep them between 45°-60°, 24 hours a day; -Maintenance of routine patient care, such as oral and endotracheal aspiration.	The prevalence of VAP was 20% in the intervention group and 73% in the control group, reducing the risk of VAP by more than three times. Patient positioning resulted in decreased lung infiltration on chest radiograph, lower axillary temperature, higher patient tidal volume, and higher lung compliance.
6. To analyze the impact of education and training of nurses on the incidence of ventilator-associated pneumonia (VAP) and central line-associated bloodstream infection (CLABSI).	-Education and training activities for the nursing team on VAP prevention methods.	The incidence of VAP increased from 28.86 to 35.06/1000 ventilation days, and this difference was not statistically significant. Education and training for a certain period of time do not influence the reduction of VAP.
7. To evaluate the effectiveness of a new oral hygiene technique in reducing the incidence of VAP in mechanically ventilated patients.	-Oral hygiene with 0.12% chlorhexidine gluconate using a kit with a toothbrush, disposable Yankauer suction catheter and a disposable syringe.	The decrease in VAP incidence was from 8.6 to 11.6 / 1000 ventilation days, with no significant difference in VAP incidence.
8. Investigate the implementation of the VAP prevention care package and the relationship to VAP rates with a quasi-experimental study.	-Elevation of the head of the bed (30°-45°); -Daily awakening from sedation and assessment of readiness to extubate; - Prophylaxis of peptic ulcer; - DVT prophylaxis; -Daily oral hygiene with chlorhexidine; -Sanitization of hands; - Adequate pressure of the endotracheal tube cuff.	VAP rates decreased from 15.91 to 8.50/103 ventilation-days. VAP prevention package compliance increased from 10.8% to 89.8%. As demonstrated by the significant difference in VAP rates, the package implementation appears to be effective.
9. The main objective was to compare the risk of VAP from a time period prior to the implementation of a hospital-wide VAP prevention package (2008 and 2009), for the time period during hospital-wide VAP prevention package implementation (2010–2012). Our secondary objective was to analyze risk factors for the development of VAP in burn patients.	-Elevation of the head of the bed to 30 °; -Daily oral hygiene with chlorhexidine; -Daily awakening from sedation and assessment of readiness to wean from mechanical ventilation; -Prophylaxis for stress ulcer; -Prophylaxis for DVT.	The VAP prevention package resulted in a reduction from 15.4 in 2008 to 9.1 in 2012, however, this result was not statistically significant.
10. Investigate the effect of using a VAP prevention checklist on decreasing cases.	-Elevation of the headboard by 30° or 45°; -Awakening daily from sedation; - DVT prophylaxis;-Aspiration of subglottic secretion; -Cuff pressure above 20 mmHg; - Prophylaxis of peptic ulcer; - Oral hygiene with chlorhexidine -Control of fluid accumulation in the circuit; -Aseptic technique of aspiration.	The VAP rate before the intervention was 38.2%, and at the end of the intervention it was 3.8%. During this study, our VAP rate decreased by approximately 75% with training, VAP prevention package, and checklist.
11. To determine the effect of hydrogen peroxide (HP) mouthwash on the incidence of ventilator-associated pneumonia (VAP) in patients admitted to the intensive care unit (ICU).	-Sanitization of hands;-Elevation of the head of the bed by 30°; -Wear sterile gloves for the procedure, and wash the oral mucosa, tongue and gingiva with 4–6 cotton swabs (depending on the patient's oral health) soaked in 15 cc of 3% HP.	The risk of developing VAP was 2.60% higher in patients using saline than those using HP. The VAP incidence rate was 14.7% in the HP group and 38.2% in the saline group. HP was more effective than normal saline in reducing VAP.
12. Implement a VAP prevention package and investigate its effectiveness in preventing the condition.	-Elevation of the headboard; -Oral hygiene; -Sanitization of hands; -Aseptic technique of endotracheal aspiration; -Removal of residual condensate from the ventilation circuit. -Control of cuff pressure.	The incidence of VAP decreased from 21.5 to 12.0 / 1,000 ventilation days. The relative risk reduction of developing VAP was 44%.
13. Evaluate the impacts and determining factors in complying with the bundle to reduce ventilator-associated pneumonia.	-Awaken sedation diary and assessment of readiness for weaning; -Daily assessment of the use of neuromuscular blockers; -Elevation of the headboard from 30° to 45°; -Measurement of gastric content before nutritional intake; -Maintenance of cuff pressure of 18 – 25 mmHg; -Oral hygiene with 0.12% aqueous chlorhexidine.	The mean density of VAP incidence increased from 11.53 to 16.42 after implementation of the prevention package. Hypotheses for this result are: lack of education and concomitant training, lack of some supplies (such as chlorhexidine), hospital overcrowding and change in staff.
14. Assess the incidence of VAP in a multidisciplinary intensive care unit and examine the effects of implementing a prevention package and educating staff about its incidence.	-Three months of education and training of the multiprofessional health team; - Elevation of the head of the bed; -Daily awakening from sedation and assessment of readiness to extubate; -Prophylaxis of peptic ulcer; - DVT prophylaxis; -Oral hygiene protocol with bicarbonate, using special single-use toothbrushes, twice a day; -Posters posted in the ICU describing the correct hand hygiene procedure.	VAP density was reduced from 21.6 to 11.6 events per 1000 ventilation days. Decrease in incidence from 23.4 to 15.4 per 100 patients. Decreased duration of ventilation use. Decreased mean length of stay in the ICU from 36 to 27 days.

15. To assess the effectiveness of a modified package of preventive measures to reduce VAP in residents of long--term care institutions on chronic mechanical ventilation.	-Sanitization of hands; -Elevation of the headboard; - Oral hygiene with chlorhexidine routinely; -Tracheostomy cannula under 15 – 22 mmHg pressure from the loon; -Measure the remaining nasogastric food before each meal for subjects fed through a nasogastric tube.	There were 33 VAP events during the 9 months prior to implementation of the VAP prevention package and 44 during the 29 months after implementation. The total VAP rate decreased from 5.97 to 2.34 per 1000 ventilation days.
16. Evaluate the effectiveness of our Focus on Goal (GR) intervention applied to the VAP prevention package on the inpatient VAP incidence rate.	Checklist with three questions to check: -(1) The head of the bed is raised to 30°; -(2) this patient is a candidate for discontinuation of sedation; -(3) Is this patient a candidate for a spontaneous breathing test to assess readiness for ventilator release? - Also including: review of peptic ulcer and DVT prophylaxis; and introduction of chlorhexidine mouthwashes.	Reduction in VAP incidence rate from 26.8 to 7.0 per 1000 days of ventilation, or a 74% decrease in VAP incidence rate. There was no significant difference in mortality rate and days on ventilation.

Source: prepared by the authors, 2020.

0.12% chlorhexidine, daily awakening from sedation and assessment of the capacity for the spontaneous breathing test, maintenance of adequate cuff pressure and subglottic aspiration. The measures presented are also those recommended by the Institute for Healthcare Improvement by the National Health Surveillance Agency. [24]

Elevation of the head of the bed is used and recommended for the prevention of VAP at an angle of 30°-45°. One of the studies evaluated the position at an angle of 60° and the results presented stated that in addition to the decrease in the incidence of VAP, there was a decrease in pulmonary infiltration, axillary temperature and an increase in the patient's tidal volume and lung compliance. [16] A literature review carried out in 2016 compares different angles of semi-recumbent positions as opposed to the supine position, with the results presented showing the benefits for VAP prevention in all semi-recumbent angles. [28]

Performing oral hygiene with 0.12% chlorhexidine is a recommendation from the Society for Healthcare Epidemiology of America and Cambridge University - SHEA of 2014, considered a measure of moderate effect, but when associated with other preventive measures, it has a great effect on the prevention of VAP. Using this measure, there is a lower frequency of VAP in patients on mechanical ventilation.[29-30]

Only one of the studies that made up the sample used a different type of mouthwash, 3% hydrogen peroxide (HP). A comparison of 3% hydrogen peroxide with saline solution was performed, showing a positive result for HP in this case. [22] However, the above solution causes burns if diluted incorrectly, and is therefore not considered safe. On the other hand, 0.12% chlorhexidine, in addition to preventing the formation of biofilm in the oral cavity, has no harm to health. [29]

The third most used preventive measure was daily awakening from sedation and assessment of capacity for spontaneous breathing testing. This measure is directly linked to the reduction of the time of use of mechanical ventilation and, consequently, to the reduction of the risk of developing VAP. On the other hand, a review study carried out in 2019 did not show the use of this preventive measure in its findings, [31] which may indicate the need to review procedures based on new hypotheses and questions in the construction of VAP bundles, considering that this measure has a high level of evidence.

Maintaining adequate cuff pressure was one of the measures frequently present in the selected sample, but the value of adequate pressure was not in agreement in the studies, in which they were presented: 18 to 22 mmHg (study 1), above 20 mmHg (study 10), 18 to 25 mmHg (study 13) and 15 to 22 mmHg (study 15). Other studies that make up the sample do not present the values, only the indication of maintaining the adequate pressure. [12-13,19,21,23-24,26]

Subglottic aspiration also appeared in a relevant way in the selected sample. This measure is recommended and has a high level of evidence according to the SHEA for the prevention of VAP, in addition to having a direct link with the reduction of the length of stay in the ICU and the use of antibiotics. [3] The purpose of subglottic aspiration in patients using MV is to avoid aspiration of contaminated secretions, which can lead to the development of VAP.

It is important to highlight that epidemiological surveillance of the results presented in the implementation of a VAP bundle in an ICU is as important as the implementation itself, [26] since performing the feedback and evaluation of these data together with the multiprofessional health team represents great relevance for the evaluation of the quality of care provided to the patient.

CONCLUSION

The study proposed the identification of VAP prevention measures used in nursing care for adult patients, so, through the analysis, it was possible to show that the most used measures are: elevation of the headboard at 30°-45°; oral hygiene and daily awakening from sedation. In addition, it is feasible to suggest the use of these methods in different hospital realities, since they are low cost.

It is worth noting that, although the-

re was agreement regarding the standard measures most used by the nursing team, there were some disagreements regarding specific points, such as the ideal cuff pressure, thus highlighting the importance of following the recommendations that have the highest level of scientific evidence.

It was also possible to identify that these measures are efficient for the prevention of VAP in a direct way, having as a key point the use of more than one measure, emphasizing that as important as the implementation of these is the epidemiological surveillance of their use.

It is expected that the study will enable improvements in nursing care for patients using mechanical ventilation and that it will help to promote discussions about the positive impacts of VAP prevention on patient safety.

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