

Nursing care practices in patient safety in use of invasive mechanical ventilation

RESUMO | Objetivo: Investigar as práticas assistenciais de enfermagem voltadas à segurança do paciente em uso de respiração artificial invasiva e evidenciar os cuidados para diminuição de potenciais riscos. Método: Trata-se de uma revisão sistemática. Realizou-se a busca por artigos; com delimitação nos últimos 7 anos (2013-2020); nos idiomas português, inglês e espanhol; disponíveis na íntegra. Nas seguintes plataformas de dados: BDNF, LILACS, MEDLINE e SciELO. Resultados: Os dados foram organizados e apresentados em figuras e tabelas. Dos 39 estudos encontrados, 12 estava disponível na BDNF, 17 na LILACS, 3 na MEDLINE e 7 na SciELO. Contudo, após a leitura permaneceram apenas os que atendiam aos critérios para inclusão e exclusão descritos na metodologia, 9 estudos. Conclusão: Pode-se evidenciar que os principais cuidados na assistência do paciente submetido a ventilação mecânica estão relacionados à prevenção de infecções; risco de extubação e cuidados relacionados à prevenção de broncoaspiração.

Descritores: Cuidados de Enfermagem; Segurança do Paciente; Respiração Artificial

ABSTRACT | Objective: To investigate nursing care practices aimed at patient safety using invasive artificial respiration and demonstrate care to reduce potential risks. Method: This is a systematic review. The search for articles was carried out; with delimitation in the last 7 years (2013-2020); in Portuguese, English and Spanish; available in full. On the following data platforms: BDNF, LILACS, MEDLINE and SciELO. Results: Data were organized and presented in figures and tables. Of the 39 studies found, 12 were available in BDNF, 17 in LILACS, 3 in MEDLINE and 7 in SciELO. However, after reading, only those who met the criteria for inclusion and exclusion described in the methodology remained, 9 studies. Conclusion: It can be seen that the main care in the care of patients undergoing mechanical ventilation is related to the prevention of infections; risk of extubation and care related to the prevention of bronchoaspiration.

Descriptors: Nursing Care; Patient Safety; Artificial Respiration.

RESUMEN | Objetivo: Investigar las prácticas de atención de enfermería dirigidas a la seguridad del paciente utilizando respiración artificial invasiva y demostrar el cuidado para reducir los riesgos potenciales. Método: Esta es una revisión sistemática. Se realizó la búsqueda de artículos; con delimitación en los últimos 7 años (2013-2020); en portugués, inglés y español; disponible en su totalidad. En las siguientes plataformas de datos: BDNF, LILACS, MEDLINE y SciELO. Resultados: Los datos se organizaron y presentaron en figuras y tablas. De los 39 estudios encontrados, 12 estaban disponibles en BDNF, 17 en LILACS, 3 en MEDLINE y 7 en SciELO. Sin embargo, después de la lectura, solo quedaron aquellos que cumplieron con los criterios de inclusión y exclusión descritos en la metodología, 9 estudios. Conclusión: Se puede observar que la atención principal en el cuidado de los pacientes con ventilación mecánica está relacionada con la prevención de infecciones; riesgo de extubación y cuidados relacionados con la prevención de broncoaspiración.

Descritores: Atención de enfermería; Seguridad del paciente; Respiración Artificial.

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INTRODUCTION

Patient safety is one of the six attributes that define the quality of health care, as well as having international goals for its effectiveness in care, and can be defined as: reduction to an acceptable minimum of the risk of avoidable damage in the provision of care in health (1, 2).

Due to the need to implement conducts that guide the provision of care with a focus on patient safety, in 2013 the Collegiate Board Resolution (RDC) No. 36 was created by the National Health Surveillance Agency (ANVISA), which aims to "institute actions to promote patient safety and improve the quality of health services". The following year, the National Patient Safety Program (PNSP) was instituted, which aims to guide the process of qualifying care in patient safety throughout the national territory (3).

Considering that the management of Mechanical Ventilation (MV) is an advanced practice in Nursing, in 2020 the Federal Council of Nursing (COFEN) instituted resolution No. 639 of May 6, which "provides for the competences of nurses in patient care in mechanical ventilation in the extra and intra-hospital environment", acting in the assembly, testing and installation of mechanical ventilation devices, as well as the application of nursing care to the patient submitted to the use of mechanical ventilation (4).

Invasive mechanical ventilation (IMV) is a mechanism used to supply oxygen deficiency in several situations that impede the effectiveness of gas exchange. The intervention consists of introducing a tube into the airway, applying positive pressure. Among the main causes of respiratory failure and the following indicative criteria for its application are: resuscitation due to cardiorespiratory arrest; hypoventilation and apnea; respiratory failure due to intrinsic lung disease and hypoxemia; mechanical failure of the respira-

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tory system; prevention of respiratory complications and reduction of respiratory muscle work (5).

Patient safety is a topic of great relevance as it is a key factor for effectiveness in health care, especially when related to the use of IMV, which is frequently used in the treatment of respiratory failure. Given the importance of the theme in the context of patient safety and use of VMI, and aiming to answer the guiding question of the study: "What are the nursing care aimed at patient safety using VMI?" nursing care practices aimed at patient safety in the use of invasive artificial respiration and evidence of care to reduce potential risks.

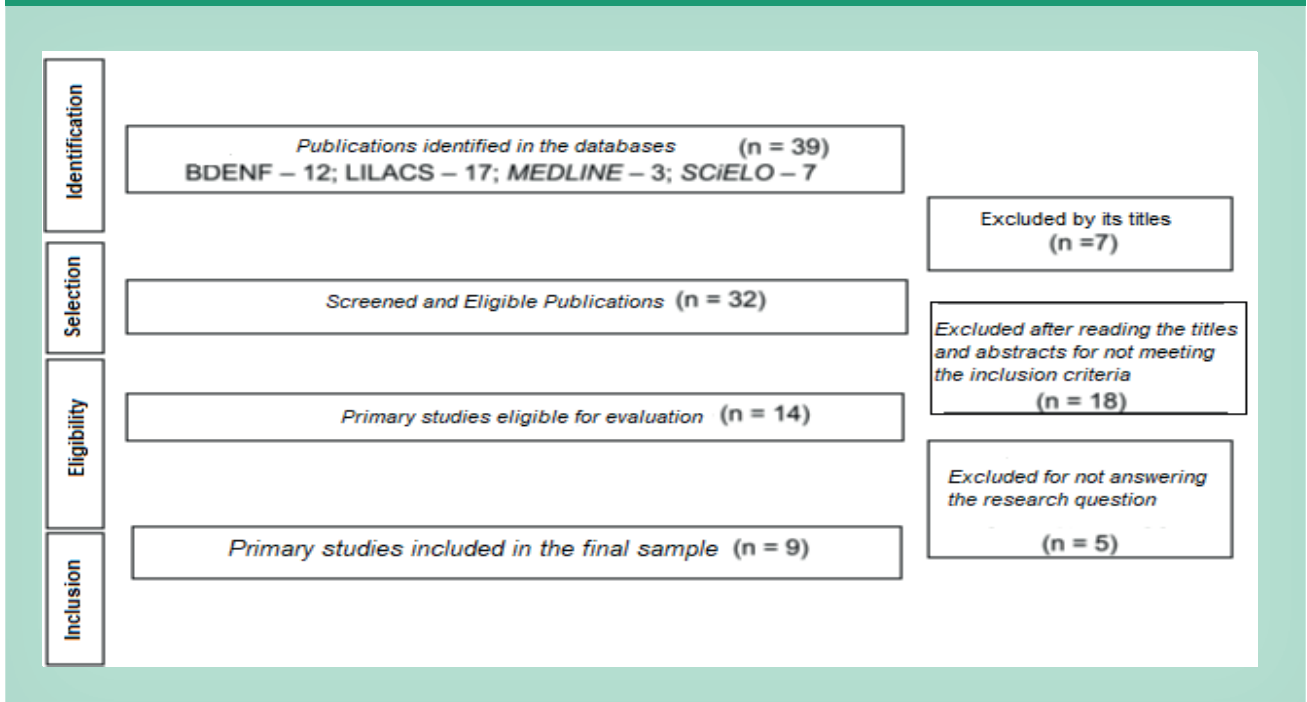
MÉTODOS

The present study is a systematic literature review. Following the steps: (1) elaboration of the guiding question and objective of the study; (2) definition of inclusion and exclusion criteria for scientific productions; (3) search for scientific studies in databases and virtual libraries; (4) analysis and categorization of the productions found; (5) results and discussion of findings (6).

For which the PICO strategy was used (P: Patient using invasive artificial ventilation; I: Nursing care; Co: Patient safety). Thus, the following guiding question of the research was defined: "What are the nursing cares aimed at patient safety using invasive artificial ventilation?".

The research was carried out through exploratory analysis through a bibliographic survey in the following databases: Latin American and Caribbean Literature in Health Sciences (LILACS); Online Scientific Electronic Library (SciELO); Nursing Database (BDENF) and Online System for Search and Analysis of Medical Literature (MEDLINE), to perform the search, the descriptors in Health Sciences (DeCS) were used: Patient safety; artificial ven-

Figure 1: Flow of the study selection process for the systematic literature review, based on PRISMA. Cachoeira,, BA, Brazil, 2020.



Source: Research data, 2020.

tilation and nursing care in association with the Boolean operator “AND” following the research model: “nursing care” AND “artificial breathing” and “patient safety” AND “artificial breathing”.

Inclusion criteria were based on: articles originally published in Portuguese, between the years 2013 to 2020, with the full text available for free and that presented a specific approach to the research question. Duplicate articles and literature review articles that did not address the relevant topic for the purpose of the review, published for more than 7 years, were excluded.

The Preferred Reporting Items for Systematic Review and Meta-Analyse (PRISMA) was used for selection, with the aim of assisting in the development of articles (7). At first, duplicated studies were eliminated by reading the titles and abstracts. Of these pre-selected ones, a full reading was carried out, in order to verify which ones meet the gui-

ding question and the inclusion/exclusion criteria. The final sample was then constructed with studies relevant to the pre-established criteria (Figure 1).

After reading the articles, the selected ones were categorized, classifying the knowledge produced in levels of evidence according to Melnyk and Fineout-Overholt (8): level I, systematic review or meta-analysis of randomized controlled clinical trials or from clinical guidelines based on systematic reviews of randomized controlled clinical trials; at level II, well-designed randomized controlled clinical trial; at level III, well-designed clinical trials without randomization; at level IV, well-designed cohort and case-control studies; at level V, systematic review of descriptive and qualitative studies; at level VI, a single descriptive or qualitative study; and at level VII, opinion of authorities and/or report of expert committees.

Aiming at the best way to understand and visualize the main findings,

the data were organized presenting them in figures and tables, exposed in a descriptive way.

RESULTS

A total of 39 articles (12 in BDEF; 17 LILACS; 3 MEDLINE and 3 in SciELO) were identified in the search, 7 files were excluded based on the titles and then 18 articles were excluded for being duplicates or incomplete text, were evaluated for eligibility 14 articles to be read in full and finally included 9 studies in this systematic review, which responded to the objective of the study and contemplated the research criteria, as can be seen in Figure 1.

It was possible to notice that the types of studies and approaches used, as represented in table 2, were as follows: descriptive, retrospective, quantitative, qualitative, descriptive and exploratory. Classifying the knowledge produced on the subject, in levels of evidence, mos-

Table 1: Identification of articles, authors, titles, database, journal and year of publication. Cachoeira, BA, Brazil, 2020.

Nº	Authors	Titles	Database	Journal/Year
1	Lúcia Marinilza Baccaria et al. (9)	Accidental Extubation and Patient Damage in a Teaching Hospital.	BDENF	CuidArte Enfermagem/2018.
2	Ligiane Aparecida Dutra et al. (10)	Pneumonia Associated with Mechanical Ventilation: perception of nursing professionals.	BDENF	Revista de Enfermagem UFPE On Line/2019.
3	Cleverson dos Santos et al. (11)	Good nursing practices for patients on invasive mechanical ventilation in the hospital emergency.	SciELO	Esc. Anna Nery/2020.
4	Elizabeth Mesquita Melo et al. (12)	Nursing care for users under mechanical ventilation admitted to an intensive care unit.	SciELO	Revista de Enfermagem Referencia/2014.
5	Oleci Pereira Frota; Marisa Dias Rolan Loureiro; Adriano Menis Ferreira. (13)	Open system endotracheal aspiration: practices of nursing professionals in intensive care.	LILACS	Esc. Anna Nery/2014.
6	Marcia Regina Eches Perugini et al. (14)	Impact of a bundle on rates of ventilator-associated pneumonia (VAP) in a pediatric intensive care unit in Londrina-PR.	LILACS	Semina: Ciências Biológicas e da Saúde/2015.
7	Edilaine Moran et al. (15)	Prevention of ventilator-associated pneumonia from the perspective of nursing students.	LILACS	J. Res. Fundam. Care. Online/2019.
8	Sabrina Guterres da Silva; Eliane Regina Pereira do nascimento; Raquel Kuerten de Salles. (16)	Pneumonia associated with mechanical ventilation: professionals' discourse about prevention.	LILACS	Esc. Anna Nery/2014.
9	Laércia Ferreira Martins et al. (17)	Nurses are prepared to face complications caused by mechanical ventilation.	LILACS	Revista Nursing/2019.

Source: Research data, 2020.

Table 2: Identification of articles according to type of study, level of evidence, objective and results. Cachoeira, Bahia, Brazil, 2020.

Nº	Type of study	Level of evidence	Objective	Results
1	Descriptive, retrospective and quantitative study. (9)	VI	Verify the incidence of accidental extubation and the degree of harm caused to the patient, through an adverse event notification system in a teaching hospital.	Accidental extubation monitoring identified flaws in work processes, especially involving patients with psychomotor agitation, therefore, nurses must be aware of and prevent these occurrences.
2	Qualitative, descriptive and exploratory approach research. (10)	VI	To apprehend the perception of nursing professionals about patient safety in mechanical ventilation with a view to preventing VAP.	Participants recognized the risks of VAP and reported implementing protocol measures for prevention. It should be noted, however, that they did not mention the notification of the adverse event, knowledge of the indicators or participation in educational strategies, which are fundamental factors for managing risks and strengthening patient safety.
3	Descriptive research with a qualitative approach. (11)	VI	Identify the care conceived as good nursing practices for patients on invasive mechanical ventilation in the context of hospital emergency.	Care conceived as good nursing practices for patients on IMV are related to the endotracheal tube, mechanical ventilator and respiratory circuit, prevention of bronchoaspiration, infection control, infection control and sedation, analgesia/pain.

4	Descriptive exploratory study with a quantitative approach. (12)	VI	Evaluate the care provided by the nursing staff to MV patients admitted to the Intensive Care Unit (ICU).	The nursing team, as it offers continuous care, needs technical-scientific foundation to perform its functions satisfactorily, contributing to the patient's clinical improvement.
5	Exploratory descriptive cross-sectional study with a quantitative approach. (13)	IV	To investigate the practices of intensive care nursing professionals regarding endotracheal aspiration (ETA) through an open system.	Professionals do not perform the ETA satisfactorily, requiring interventions that promote behavioral changes through continuing education to improve the quality of care provided.
6	Cross-sectional intervention study. (14)	IV	Implement the VAP bundle, check the frequency of pneumonia in children undergoing mechanical ventilation, as well as assess the health team's adherence to recommended preventive measures, before and after training.	This study showed that the frequency of VAP decreased after the implementation of the bundle for prevention and that educational interventions favor adherence to precautionary measures for pneumonia.
7	Descriptive study of a quantitative nature. (15)	VI	Describe the knowledge of undergraduate nursing students about the Prevention of VAP and compare this knowledge among undergraduate nursing students in 2013 and 2016.	Students may be completing the course with a basic notion of care for the prevention of Pneumonia Associated with Mechanical Ventilation, and some unobserved care is a necessary result to be re-evaluated, requiring a curriculum planning of educational institutions that facilitates the teaching-learning process.
8	Descriptive research of a qualitative nature. (16)	VI	Identify the care that ICU nursing and physiotherapy professionals know to consider important preventions for Pneumonia Associated with Mechanical Ventilation.	The analysis of the Collective Subject Discourse suggests that the professionals have a good theoretical knowledge about preventive measures for Pneumonia Associated with Mechanical Ventilation; however, it reveals the challenge to implement some care in the care routine.
9	Descriptive, exploratory study with a quantitative approach. (17)	VI	Assess nurses' knowledge about complications related to MV.	It is inferred the need for training and training of professional nurses on complications related to mechanical ventilation, so that these professionals effectively participate in the construction of their process of evidence-based practices, propagating safe and holistic patient care.

Source: Research data, 2020.

tly level VI - evidence derived from a single descriptive or qualitative study

Given the above, the care provided to patients under mechanical ventilation is mainly aimed at the adherence of techniques that minimize the risks of infections related to health care (HAI), prevention of bronchoaspiration, risks

of disturbance and other related care regarding good care to the health of the patient using IMV.

DISCUSSION

The publications state that the main care in the care of patients undergoing mechanical ventilation is related to the

prevention of infections; risk of extubation and care related to the prevention of bronchoaspiration. Among the care related to the prevention of infections, hand washing is one of the most impactful methods, which despite its evidence, several studies claim that its adherence is still limited by multiple factors,

compromising patient safety. (11, 12, 14)

Endotracheal aspiration (ETA) of critically ill patients undergoing orotracheal intubation or tracheostomy within the nursing team, in emergency, intensive, semi-intensive, intermediate or other care units must be performed privately by the nursing professional, as provided for in the Law on Professional Practice of Nursing cited by resolution 557/2017 in its Article 2. (18)

According to a study carried out in 2014, ETA is one of the most performed procedures in the ICU, and the second procedure that is related to the incidence of accidents, it listed 23 precautions aimed at performing this technique, with the initial focus on evaluating the need for aspiration. This assessment conduct is provided for in resolution 639, of May 6th, 2020 in its art. 3rd paragraph II as exclusive to the nurse. (5, 11, 12, 13)

Another precaution aimed at patient safety using mechanical ventilation, of fundamental importance is the verification of the cuff pressure, which according to ANVISA must be kept between 20 to 30 cm H₂O, in order to prevent injuries, as well as to prevent secretion from the subglottic region flows around the cuff, reaching the lung. The frequency for verification according to the III Brazilian Consensus on Mechanical Ventilation (CBVM - Consenso Brasileiro de Ventilação Mecânica) must comply with the frequency of 12 /12 hours, since cuff pressure can cause necrosis of the trachea or tracheoesophageal fistula. (4, 12, 14)

In a study focused on the prevention of VAP, ICU professionals recommended the sequence of care following the aspiration of the oral cavity, proceeding with checking the cuff pressure and oral hygiene with 0,12% chlorhexidine gluconate, to prevent bronchoaspiration and, consequently, VAP. (12)

Regarding the care with the tube and circuits of the mechanical venti-

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lator, ANVISA recommends that the change be carried out only when dirty or damaged, as the change being less than 48 hours can increase the probability of contamination, paying attention to the adjustment fixation because the pressure exerted by the lace can cause lip and ear damage. (11, 12)

Regarding the risks of extubation, a study showed that this is the least frequent complication among respiratory complications, but more common in the nursing world, with its premature loss due to agitation or incorrect handling of the orotracheal tube (OTT) by the team during routine procedures, such as bed baths, changing the fixation of the OTT, inadequate fixation and cuff with lower pressure parameters than recommended. (9, 16, 17)

Relevant data regarding patient care using invasive mechanical ventilation is contained in a survey conducted by the Clinical Research Center (NUPEC) of a hospital in the city of Fortaleza/CE, which showed that 86,4% of the nurses interviewed reported not having received sufficient information about the care used in assisting this public, this data corresponds to a study carried out in 3 ICUs of a public hospital, located in Fortaleza/CE, which found the lack of knowledge as one of the difficulties faced by professionals with regard to patient care in MV. (12,17)

A small sample was found through search strategies and few scientific articles to compare the results. Since few articles emerged as a result of the descriptors, few fulfilled the objective of the study. Including limitations such as small sample size and lack of randomization.

CONCLUSION

At the beginning of this study, it was found that there is a need to review the care applied to the care of patients using IMV, given its importance in their safety, especially when related to the

conducts employed by the nursing staff.

It was concluded that there are plausible relationships between the studies, demonstrating the quality of the level of evidence, as well as the need for further studies in the research area, since, although the care provided to patients

undergoing mechanical ventilation is something fundamental importance for the quality of nursing care, there are still few studies aimed directly at this target audience. With this work, the need for further studies to be carried out more comprehensively is reinfor-

ced in order to expand knowledge on the subject, in addition to promoting comprehensive scientific evidence, given the importance of patient safety using MV, reducing risks and worsening during the provision of care.

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