Action of the nurse in front of patients submitted to mechanical ventilation in emergency emergency

RESUMO | Avaliar a atuação do enfermeiro nos cuidados aos pacientes submetidos à ventilação mecânica na emergência de um hospital público do Distrito Federal. Método: estudo descritivo e exploratório, de abordagem quantitativa realizada com enfermeiros através de um instrumento semi-estruturado elaborado pelos pesquisadores, compreendendo o período de junho a agosto de 2021. Os dados coletados foram compilados no Microsoft Excel for Windows e submetidos a análises estatísticas descritivas. Resultados: as ações de enfermagem menos realizadas foram a checagem do nível do tubo endotraqueal (30%) e a avaliação da relação P/F (27,5%). Já a monitorização multiparamétrica foi o cuidado mais citado pelos enfermeiros, com 97,5%. A Pneumonia Associada à Ventilação Mecânica foi a complicação mais citada pelos profissionais (63,1%). Conclusão: após análise dos dados foi possível observar que há a necessidade de maior investimento em treinamento contínuo aos profissionais enfermeiros desde a formação acadêmica até a atuação destes na prática assistencial.
Descritores: Respiração artificial; Cuidados de enfermagem; Emergências.

ABSTRACT | To avaliate the nursing care to the patientes undergoing on mechanical ventilation in the emergency in the public hospital in Federal District. Methods: descriptive and exploratory study, with quantitative approach with nurses through a semi-structured instrument developed by the researchers, covering the period from June to August 2021. The data collected were compiled in Microsoft Excel for Windows and subjected to descriptive statistical analysis. Results: the least performed nursing actions were checking the level of endotracheal tube (30%) and P/F avaliation (27,5%). Multiparametric monitoring was the care most cited by nurses, with 97,5%. Pneumonia Associated with Mechanical Ventilation was the most cited complication by professionals (63,1%). Conclusion: after data analyzing, it was possible to observe that there is a need for greater investment in continuous training for nurses, from academic training to theis performance in care practice.
Keywords: Artificial Respiration; Nursing Care; Emergencies.

RESUMEN | Evaluar el papel de los enfermeros en el cuidado de pacientes sometidos a ventilación mecánica en el servicio de urgencias de un hospital público del Distrito Federal. Método: estúdio descriptivo y exploratório, con abordaje cuantitativo realizado con enfermeiros através de um instrumento semiestructurado desarrollado por los investigadores, que abarcó el período de junio a agosto de 2021. Los datos recolectados fueron compilados en Microsoft Excel for Windows y sometidos a análisis estadístico descriptivo. Resultados: las acciones de enfermería menos realizadas fueron verificar el nível del tubo endotraqueal (30%) y evaluar la relación P/F (27,5%). El seguimiento multiparamétrico fue el cuidado más citado por los enfermeros, con 97,5%. La Neumonía Asociada a Ventilación Mecánica fue la complicación más citada por los profesionales (63,1%). Conclusión: después del análisis de los datos, fue posible observar que existe la necesidad de una mayor inversión en la formación continua de los enfermeros, desde la formación académica hasta su desempeño en la práctica asistencial.
Palabras claves: Respiración Artificial; Atención de Enfermería; Emergencias.

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INTRODUCTION

Mechanical Ventilation (MV) is a method of ventilatory support that aims to ensure effective

gas exchange in patients with respiratory compromise. [1-2] It is possible, through MV, to make adjustments that interfere in the demand and supply of oxygen and, in addition to improving the breathing pattern, can generate hemodynamic repercussions. [2-3]

According to the Brazilian Mechanical Ventilation Guideline (DBVM) of 2013, MV can be classified into invasive mechanical ventilation (IMV) and non-invasive ventilation (NIV). IMV occurs through access to the trachea through an endotracheal tube or tracheostomy cannula, which can be an elective or emergency procedure. NIV is characterized by using pressures that will ensure both spontaneous ventilation of the patient during inspiration and the supply of expiratory pressure that will prevent atelectasis. [4]

Because it presents multiple variables, MV is considered a complex device, requiring technical and scientific skills from professionals for the correct handling of the ventilator. [1-2]

Complications arising from the prolonged use of ventilatory support are diverse and include accidental extubations, infections, hypoxemia, arrhythmias, skin lesions, iatrogenic injuries, among others, and may interfere with the clinical management and prognosis of the patient. [2,5-6-7-8]

One study observed that 77.3% of nurses reported not knowing how to recognize MV-related complications in their daily work. In addition, 50% of nurses fear for the safety of MV patients under their care. [2]

However, the Federal Nursing Council (COFEN), through Resolution nº 693/2020, granted more autonomy to nurses in the management of patients on MV, including ventilator adjustments, as they are considered as Advanced Nursing Practice. [9]

Considering the high frequency of ventilatory support in the current context, mainly due to the Acute Respiratory Distress Syndrome (ARDS) related to COVID-19, the nurse must be even more prepared to act to help with the installation of the airway, as well as continuous monitoring of parameters, attention to alarms and possible repercussions on the patient with oxygen support. [4,9-10]

In view of the above, we sought to evaluate the performance of assistance nurses with regard to care for patients undergoing artificial respiration in the emergency department of a public hospital in the Federal District.

METHOD

This is a descriptive and exploratory study, with a quantitative approach that was developed in the Clinical and Cardiological Emergency Box (BOX PSA), as well as in the Respiratory Emergency Box (BOX COVID) of a regional hospital in the DF.

The study population consisted of nurses who work in at least one of the sectors, BOX PSA and/or BOX COVID, during data collection from June to August 2021. The number of nurses was determined by an exhaustive sample in order to include the entire universe to which the study refers, considering the number of 59 professional nurses who make up the nursing team in these sectors. This method was selected because the total population is composed of a small number of individuals and, therefore, only this number would be representative of the universe. In addition, the previously defined inclusion and exclusion criteria were taken into account.

Of the 59 nurses who make up the staff of the PS in question, 19 were excluded, being 1 a nurse who worked exclusively in the management area, 5 were on sick leave, 10 had been in the sector for less than six months, 1 nurse did not work in the Emergency Box and 2 refused to participate.

Data collection was performed using a semi-structured instrument developed by the researchers. The research instrument was developed based on a review of scientific literature on the subject. [4, 11-12]

The application of the aforementioned instrument was carried out individually with each professional in a reserved place in order to ensure the guarantee of the participants' privacy, with an average duration of approximately 20 minutes, the time allocated to reading, agreeing and signing the Free and Informed Consent Term (ICF) is already included.

The collected data were typed and organized in Microsoft Excel for Windows® and submitted to descriptive statistical analysis. In addition, a simple crossing of the variables used in the study was performed to evaluate possible significant correlations found.

This study complied with the precepts established by Resolution No. 466/2012 of the National Health Council, being approved by the Research Ethics Committee of the Foundation for Teaching and Research in Health Sciences, by opinion No. 4,694,129.

RESULTS

The study included 40 assistant nurses, 25 (62.5%) of whom were female. The age ranged from 31 to 56 years, with a mean of 40.72 years. With regard to the level of education, 34 (85%) have a graduate degree, 29 (85.3%) with a specialization, 4 (11.7%) with a master's degree and 1 (3%) with a doctorate.

The participants' training time averaged 13.75 years, with a minimum of 6 and a maximum of 24 years. In addition, it was possible to evaluate the professional experience of nurses, citing several areas, such as the Emergency Room (87.5%), Intensive Care Unit (40%) and Medical Clinic (30%). As the nurses had experience in more than one sector, the total sum of the percentages was greater than 100%.

Regarding the working time in the Emergency Room of this hospital, the period of 1-3 years predominated (45%), as observed in Table 1. In addition, most nurses (52.5%) work in both emergency rooms , which can also be seen in the table.

Regarding access to MV content, 18 (45%) nurses reported that they had only one undergraduate course that addressed the topic, followed by 9 (22.5%) who had no access to the topic during their academic training. In addition, 20 (50%) of the nurses reported having taken a course in which the topic of IMV had been addressed. Such results can be seen in Table 2.

Regarding the management of the mechanical ventilator, the nurses had to answer five questions, indicating the degree of agreement based on the Likert scale, as seen in Table 3. Only 2 (5%) professionals fully agreed that they have enough information about the management of MV. In addition, when asked if the institution has already offered some training on the care of patients on IMV, 11 (27.5%) and 16 (40%) marked it as "almost never" and "never", respectively.

Only 8 (20%) of the professionals fully agreed with question 4, which concerns whether the professional feels safe to provide care to patients on IMV and, these same professionals answered that they had already taken a course, previously, in which the theme of MV was addressed.

Regarding the care provided to patients on MV, the nurses indicated, among a list, the actions they performed for these patients. It was observed that 39 (97.5%) indicated continuous monitoring, 38 (95%) aspiration of the airways and 38 (95%) gasometric monitoring, as the most performed actions by professionals. On the other hand, checking the level of the endotracheal tube 12 (30%) and assessing the PaO2/FiO2 ratio 11 (27.5%) were the least performed actions by nurses, as seen in

Table 1. Time and place of work of nurses in the Emergency Room

Variables	n	%
Time working in the sector		
< 1 year	7	17,5%
1 – 3 years	18	45%
3 – 5 years	2	5%
5 – 7 years	6	15%
7 – 10 years	1	2,5%
>10 years	6	15%
Place of work in the Emergency Room		
PSA BOX	1	2,5%
COVID BOX	18	45%
PSA BOX and COVID BOX	21	52,5%

Source: Own authorship, 2022.

Table 2. Access to Mechanical Ventilation content.

Variables	n	%
Graduation subjects		
None	9	22,5%
One	18	45%
Two	7	17,5%
Three or more	6	15%
Conducted a course on the subject		
Yes	20	50%
No	20	50%

Source: Own authorship, 2022.

Table 4.

By performing simple crossings between the variables, it was possible to correlate the level of education with the actions performed by nurses to patients on IMV. With regard to continuous multiparametric monitoring, 33 (97%) of postgraduate professionals and 6 (100%) of professionals with only a nursing degree perform this care.

Oral hygiene was a care indicated by only 21 (61.7%) of the professionals with postgraduate degrees and by 5 (83.3%) of the graduated professionals. In addition, of the total of 20 nurses who have already taken a course on MV, 13 (65%) indicated that this is a care they perform.

With regard to checking the OTT

level of patients on IMV, most professionals, whether they are graduates or postgraduates, reported that this is a care not performed by them, with 5 (83.3%) and 26 (76.4%), respectively. Furthermore, even among professionals with some training in MV, only 7 (35%) reported performing this care.

The evaluation of the P/F ratio by the professionals was also a relevant data obtained in this study, considering that this evaluation is only performed by 8 (23.5%) postgraduate nurses. In those with training in VM, this action is performed by only 7 (35%) professionals.

When asked about the main complications that can occur in patients undergoing IMV, professionals were

Table 3. Closed questions answered by nurses.

Question	Likert scale - N (%)				
	TA	PA	NA/ND	PD	SD
Do you consider that you have enough information about the management of the mechanical ventilator?	2 (5%)	20 (50%)	3 (7,5%)	9 (22,5%)	6 (15%)
Do you carry out the assembly, testing and/or checking of the mechanical ventilator?	9 (22,5%)	19 (47,5%)	2 (5%)	7 (17,5%)	3 (7,5%)
Have you received any training at the institution about the care of patients undergoing mechanical ventilation?	0 (0%)	4 (10%)	9 (22,5%)	11 (27,5%)	16 (40%)
Do you feel safe to provide care to patients on IMV?	8 (20%)	20 (50%)	4 (10%)	6 (15%)	2 (5%)
Are you aware of the criteria for extubation of the patient?	5 (12,5%)	20 (50%)	3 (7,5%)	8 (20%)	4 (10%)

Caption: TA = Totally agree; PA = partially agree; NA/ND = neither agree nor disagree; PD = partially disagree; SD = strongly disagree. Source: Own authorship, 2022.

able to cite more than one. However, two professionals failed to answer this question, consequently reducing the value of n to 38. The complications listed were analyzed and are contained in Table 5.

The results obtained demonstrate that the lack of knowledge about IMV in critically ill patients in the emergency, both in academic and professional training, influences the nursing care provided to critically ill patients.

DISCUSSION

Regarding the approach to the topic MV during graduation, the data of the present study contrast with data found in a study carried out in Iran, with 53 nurses, in which 84.9% of professionals reported having received training in MV during their academic training. [13]

In a study carried out in a tertiary hospital in the state of Ceará, it was observed that 19 (86.4%) of the professionals said they had not received enough information to manage care for patients on IMV during their academic training. [2] Similar findings were also found in a study carried out in 2018, pointing out that 86.36% of nurses reported not having received enough information about MV during graduation. [14]

Also according to a study carried

Table 4. Main actions carried out by nurses

Actions	n	%
Continuous monitoring	39	97,5%
Airway aspiration	38	95%
Blood gas monitoring	38	95%
Decubitus between 30º and 45º	32	80%
Fastener replacement	28	70%
Registration of MV parameters	28	70%
Oral Hygiene	26	65%
Change of decubitus	24	60%
Cuff pressure control	21	52,5%
Management of MV alarms	17	42,5%
OTT level check	12	30%
P/F Ratio Assessment	11	27,5%

Source: Own authorship, 2022.

out in 2019, 12 (54.5%) of the nurses interviewed reported having already carried out some training in which the theme of MV was addressed and that 11 (50%) of the total of professionals rated it as regular their knowledge on the subject. [2] These results corroborate those found in the present study, in which 20 (50%) of the nurses had already taken a course on the subject of mechanical ventilation (Table 2), but only 5% [2] considered they had sufficient information about ventilator management (Table 3).

As reported by some nurses in the present study, taking courses on the MV theme provides security during care, corroborating the conclusion of a research carried out whose training and continuing education significantly improve actions aimed at care practice. [15]

On the other hand, it is important to emphasize that factors in addition to the nurses' level of knowledge can influence patient care, a fact that could be observed in this research. The performance of oral hygiene in patients on IMV performed both by postgraduate professionals and by professionals who

have already taken a course with the theme of ventilation was only 61.7% and 65%, respectively.

These results corroborate a study carried out with 120 nurses from Intensive Care Units (ICU) that sought to evaluate the performance of actions for the prevention of Ventilator-associated Pneumonia (VAP) and obtained as a result that, in addition to continuous training, nursing actions are greatly influenced by the workload of these professionals, in addition to the number of patients per nurse. [16]

When asked about the main complications that affect patients on IMV, VAP was the most cited by nurses, with 63.1%. In addition, oral hygiene, a simple and preventive action of VAP, was not one of the care widely performed by professionals. It is known that VAP is an infection of the lower airways that affects patients undergoing OTI and is considered the infection that most commonly occurs in patients on MV, which may influence the patient's prognosis, in addition to being directly related to the prolongation of hospitalization time, as well as the increase in hospital expenses. [4,15-16]

A study whose objective was to evaluate the knowledge of nurses regarding the prevention of VAP in patients on MV in the emergency sector, pointed out that none of the professionals answered correctly to the nine items of the questionnaire, evidencing a lack of knowledge on the subject. [13]

Skin lesions, a very frequent complication in clinical practice, were mentioned by only 9 (23.7%) of the nurses and, according to a survey carried out in 2016, patients on IMV are at increased risk of developing injuries due to impaired mobility, in addition to increased friction and shear forces in 30º and 45º decubitus. [6] It is important to emphasize that skin and/or mucosal lesions, whether or not caused by devices, are extremely relevant and can contribute to the emergence of compli-

Table 5. Identified complications

Complications	n	%
Ventilator-associated pneumonia	24	63,1%
Accidental Extubation	19	50%
Barotrauma	12	31,5%
Bronchoaspiration	9	23,7%
Tracheal injury	9	23,7%
Skin lesions	9	23,7%
Pneumothorax	7	18,4%
Stoppers	7	18,4%
Selective intubation	6	15,7%
Acid-base disorders	4	10,5%
Others	29	76,3%

Source: Own authorship, 2022.

cations, prolonging the hospital stay of patients. [6,13,17]

Checking the TOT level was marked as performed by only 12 (30%) professionals in this study. In addition, it was possible to observe that even those who had already taken a course on IMV or even postgraduate professionals had high rates of not performing this care, with 65% and 76.4%, respectively.

Checking the OTT level is extremely important and is considered a nurse's competence. [9] In addition, due to the fact that the nursing team performs frequent movements of the patient on IMV, which can cause accidental displacement of devices, it has as a primary care, the regular checking of the TOT, as well as cuff pressure, and be aware of clinical, laboratory and imaging signs that the patient may present in cases of device malposition. [4,13]

Finally, the assessment of the PaO2/FiO2 ratio was the least performed action by nurses in this study. Even postgraduate professionals, the rates of carrying out this assessment were low, cited by only 8 (23.5%) of the nurses. The P/F ratio is commonly used to assess the degrees of Severe Acute Respiratory Syndrome (SARS) in critically ill hospitalized patients undergoing IMV and should be evaluated in asso-

ciation with other factors such as blood gas monitoring and assessment of the patient's hemodynamics, in order to implement or not other interventions, such as pronation. [18] It is important to emphasize that the level of education of nurses in isolation is not related to best nursing practices, but rather a set of access to the best evidence, as well as the search for updates in professional practice. [19,20]

CONCLUSION

Even today, there is a gap in nursing practices aimed at patients on invasive mechanical ventilation in the emergency sector. This fact is extremely relevant, in view of the current pandemic moment still experienced and how important artificial respiration therapy is.

In addition, it is up to hospital managers to continuously provide training to professionals who provide direct care to critically ill patients in emergencies, as infectious and hemodynamic complications can occur more commonly, interfering with the patient's prognosis.

It is worth mentioning that nurses, for having activities that go beyond assistance, end up overloaded in their functions if there is still overcrowding in the sectors, professional deficit and

excessive workload, which can compromise patient care.

As this research was carried out in the emergency department of only one regional hospital, further studies are recommended for a better overview of the situation at the local, regional and national levels.

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