REVISTA TÓPICOS
ISSN 2965-6672 | Qualis A2

ADHERENCE OF A MULTIDISCIPLINARY TEAM TO THE CARE BUNDLE FOR VENTILATOR-ASSOCIATED PNEUMONIA IN AN ADULT INTENSIVE CARE UNIT

ADESÃO DE UMA EQUIPE MULTIDISCIPLINAR AO PACOTE DE CUIDADOS PARA PNEUMONIA ASSOCIADA À VENTILAÇÃO VENTILADA EM UMA UNIDADE DE TERAPIA INTENSIVA PARA ADULTOS

Ciências da Saúde • 05/08/2026

REGISTRO DOI: 10.70773/revistatopicos/785821706

Adriana Tavares Hang[1]

Camila de Oliveira Souza Dias[2]

Daniela Ribeiro da Cruz[3]

Jandra Cibele Rodrigues de Abrantes Pereira Leite[4]

Patrícia Lima Ernesto da Silva Nonato[5]

Rosa Maria Ferreira de Almeida[6]

Samantha de Freitas Campos[7]

ABSTRACT

Objective: This study was aimed at assessing the impact of an educational intervention on adherence to the prevention bundle for ventilator-associated pneumonia. **Methods:** This quantitative, descriptive, observational study investigated the adherence of a multidisciplinary ICU team to a ventilator-associated pneumonia prevention bundle before and after an educational intervention. in Porto Velho, Rondônia, Brazil. **Results:** During the pre-intervention phase, 893 observations of professional practices were recorded, with an overall compliance rate of 58.2%, exceeding non-compliant practices across all shifts. Following the educational intervention, which involved 81 professionals, the number of observations increased to 1,406 (+63.5%), and overall compliance rose to 61%, with the highest rate observed during the morning shift (63.2%). There was also a reduction in contraindications from 4.1% to 2.7%, along with a shift in patient profile, marked by a higher prevalence of orotracheal intubation. Statistical analysis revealed a significant difference between the phases ($p < 0.000001$) and a moderate negative correlation ($r = –0.68$), demonstrating the positive impact of the multimodal intervention on adherence to best practices. **Conclusion:** The educational intervention demonstrated a positive impact on adherence to best practices for the prevention of ventilator-associated pneumonia, reinforcing the importance of continuing professional education as a strategic approach to consolidating safe care routines and promoting quality of care in the Intensive Care Unit.

Keywords: Ventilator-Associated Pneumonia; Patient Care Team; Patient Care Bundles; Clinical Practice Guide; Intensive Care Unit; Healthcare-Associated Pneumonia.

RESUMO

Objetivo: Este estudo teve como objetivo avaliar o impacto de uma intervenção educativa na adesão ao pacote de medidas de prevenção da pneumonia associada à ventilação mecânica. Métodos: Este estudo quantitativo, descritivo e observacional investigou a adesão de uma equipe multidisciplinar de UTI a um pacote de medidas de prevenção da pneumonia associada à ventilação mecânica antes e depois de uma intervenção educativa, em Porto Velho, Rondônia, Brasil. Resultados: Durante a fase de pré-intervenção, foram registradas 893 observações de práticas profissionais, com uma taxa de conformidade geral de 58,2%, superando as práticas de não conformidade em todos os turnos. Após a intervenção educativa, que envolveu 81 profissionais, o número de observações aumentou para 1.406 (+63,5%) e a conformidade geral subiu para 61%, sendo a maior taxa observada no turno da manhã (63,2%). Houve também uma redução nas contraindicações de 4,1% para 2,7%, juntamente com uma mudança no perfil dos pacientes, marcada por uma maior prevalência de intubação orotraqueal. A análise estatística revelou uma diferença significativa entre as fases ($p < 0,000001$) e uma correlação negativa moderada ($r = –0,68$), demonstrando o impacto positivo da intervenção multimodal na adesão às melhores práticas. Conclusão: A intervenção educativa demonstrou um impacto positivo na adesão às melhores práticas para a prevenção da pneumonia associada à ventilação mecânica, reforçando a importância da educação profissional continuada como uma abordagem estratégica para consolidar rotinas de assistência segura e promover a qualidade do cuidado na Unidade de Terapia Intensiva.

Palavras-chave: Pneumonia Associada à Ventilação Mecânica; Equipe de Assistência ao Paciente; Pacotes de Medidas de

Assistência ao Paciente; Guia de Prática Clínica; Unidade de Terapia Intensiva; Pneumonia Associada aos Cuidados de Saúde.

1. INTRODUCTION

The intensive care unit (ICU) is a critical setting where admitted patients might be hemodynamically unstable and be at high risk of healthcare-associated infections (HAIs), the most prevalent among which is ventilator-associated pneumonia (VAP).[1-3] A global epidemiological study on VAP highlighted its marked prevalence in healthcare settings around the world. The prevalence rate of VAP has been reported to be 15.6%, with the related mortality rate ranging from 20% to 60%. A study conducted in Brazil compared hospitalization costs between patients with and without HAIs. The costs for patients with HAIs were 55% higher, primarily owing to prolonged hospital stays, and the estimated public health expenditure was approximately USD 40,000 per case.[1,2,4]

Optimal healthcare can reduce the prevalence of VAP and increase patient safety, requiring multidisciplinary educational strategies and regular reviews. Care bundles have proven to be effective tools for reducing the risk and incidence of HAIs when integrated into routine care.[1,4] However, in the current Brazilian scenario, ICU professionals may not effectively adhere to prevention bundles, which demonstrates the need for continuous professional education programs.[1,5] This study evaluated the impact of an educational intervention on adherence to the VAP prevention bundle by the multidisciplinary team of an ICU in Porto Velho, RO, Brazil, by comparing outcomes before and after the intervention.

2. METHODS

This quasi-experimental, quantitative, descriptive, prospective field study was designed to assess the impact of a planned educational intervention on the adherence of a multidisciplinary team to a ventilator-associated pneumonia (VAP) prevention bundle. The research was conducted in an Intensive Care Unit (ICU) located in the Western Amazon region, where the predominant patient profile consists of individuals with chronic non-communicable diseases. The study population comprised physicians, physiotherapists, nurses, and nursing technicians who were members of the ICU multidisciplinary team.

Data collection was based on the VAP prevention bundle checklist from the Saúde em Nossas Mãos Project, part of the Brazilian Patient Safety Program. The bundle, implemented in the ICU, consists of nine items. Adherence to preventive measures was categorized as compliant (C), non-compliant (NC), or contraindicated (CI). The study was conducted in three stages. The first stage, the pre-intervention phase, consisted of observational data collection over seven consecutive days across three shifts (morning, afternoon, and evening). During this period, researchers observed routine ICU practices and completed the VAP prevention bundle checklist according to predefined criteria. The second stage involved an educational intervention directed at the multidisciplinary team, developed after preliminary analysis of the baseline data. The intervention included a 30-minute educational video, produced in collaboration with the multidisciplinary team coordinators, including the dentist, to explain the bundle components. Additionally, discussion sessions and an interactive quiz were conducted to reinforce the content. The intervention also included the presentation of healthcare-associated infection (HAI) rates and was attended by representatives of the Intra-Hospital Infection Control

Committee (CCIH) and the Patient Safety Center (NSP). The third stage corresponded to the post-intervention phase and involved a new observational assessment using the same instrument and methodology applied in the pre-intervention stage, allowing comparison of outcomes before and after the intervention to evaluate its impact on adherence to the VAP prevention bundle.

Data collected during the observational phases were organized and grouped, with each bundle item considered a process indicator. The data were tabulated in Microsoft Excel and subsequently exported to SPSS software (version 23.0) for statistical analysis. Frequency analyses were performed to calculate adherence percentages for each indicator, assessing performance across all bundle items. Results are presented in tables as absolute values. The chi-squared test of independence was applied to assess the association between the study phases and adherence to the VAP prevention bundle.

The study was approved by the Research Ethics Committee under opinion number 5,396,578. Data collection was initiated only after ethical approval was granted. All participating physicians, physiotherapists, nurses, and nursing technicians working in the ICU who agreed to participate signed an informed consent form. Professionals who were on vacation, leave, or otherwise absent during the data collection period were excluded from the study.

3. RESULTS

The study included 62 professionals who completed the questionnaire, representing a 3% increase over the calculated sample size of 60 professionals. Of these, 9 (14.51%), 8 (12.9%), 11 (17.73%), and 33 (53.22%) were physicians, nurses, physiotherapists,

and nursing technicians, respectively (Table 1). Among the participants, all of the physicians and nurses and 81.81% of the physiotherapists had more than 36 months of ICU experience, whereas 57.57% of the nursing technicians had between 12 and 36 months of experience. Regarding employment, 55.55% of the physicians reported holding three employment positions, while 87.05% of nurses and 57.57% of nursing technicians reported two. Concerning specialization in intensive care, 63.63% of the physiotherapists, 50% of the nurses, and 22.22% of the physicians had graduate qualifications in the field (Table 2). Additionally, all participant physicians, nurses, and physiotherapists reported knowing what VAP is, while 33.33% (n = 11) of the nursing technicians indicated that they did not know (Table 2).

The first stage consisted of observational data collection over a 7-day period, during which a total of nine patients on mechanical ventilation (MV) were recorded. The patient profile during this phase suggests a prevalence of neurological cases among individuals on MV. Table 3 shows the descriptive analysis of the items included in the VAP prevention bundle observed during the first stage of the study.

The analysis demonstrated that, across all shifts, the proportion of compliant items exceeded that of non-compliant ones, with the compliance rates being 52.24%, 63.82%, and 63.4% in the morning, afternoon, and evening. The corresponding non-compliance rates were 39%, 36.1%, and 36.59%. The overall compliance, non-compliance, and contraindication rates were 58.2%, 37.6%, and 4.14%, respectively. A total of 893 observations were recorded during this stage.

The intervention phase involved 69 multidisciplinary ICU professionals, including nurses, nursing technicians, physicians, physiotherapists, and 12 professionals from other areas, totaling 81 participants. The professionals exhibited a high level of engagement during the educational intervention. Attendees demonstrated interest in the content of the educational video and actively participated in collaborative discussions, exchanging comments and reflections on the practices presented. The active participation of the professionals was also evidenced by their performance in the quiz conducted at the end of the intervention. All questions were answered correctly, including: “How important is it to check cuff inflation?,” “Name an item from the VAP prevention bundle,” and “Which aspect is more important in oral hygiene: chlorhexidine use or mechanical removal of debris?” The results indicated that the participants possessed solid technical knowledge and understanding of VAP prevention protocols.

The third stage consisted of post-intervention observational data collection over a 7-day period, during which 13 patients were monitored. As in the first stage, neurological diagnoses were more prevalent, accounting for 53.85% of cases (7 patients). Cardiac diagnoses represented 15.38% (2 patients), while pulmonary sepsis, VAP, community-acquired pneumonia, and cutaneous sepsis each accounted for 7.69% (1 patient each).

Table 4 shows the descriptive analysis of the items comprising the VAP prevention bundle observed during the third stage. The analysis showed that compliance rates remained higher than non-compliance rates across all shifts, particularly in the morning. Although a slight decline was observed during the afternoon and evening shifts, overall compliance reached 61.02%, indicating an

improvement compared with the first stage. The total number of observations increased by 63.51% relative to the first stage. The prevalence of patients with orotracheal intubation (OTI) increased in the post-intervention stage (54.1%) compared with the pre-intervention stage (16.3%), while the proportion of patients with tracheostomy decreased from 83.67% to 45.83% (Table 5).

The chi-squared test of independence revealed a significant difference ($p < 0.000000$) between the two stages of the study. The absolute number of compliant practices increased from 520 to 858 observations, while non-compliant practices increased from 336 to 510 observations. However, this increase occurred alongside a substantial rise in the total number of observations (from 893 to 1,406). When analyzed proportionally, compliance improved from 58.2% in the pre-intervention phase to 61.0% in the post-intervention phase, indicating a modest improvement in adherence to the prevention bundle following the educational intervention. These findings suggest the positive impact of the intervention on protocol adherence in the ICU.

4. DISCUSSION

The study revealed that 63.63% of physiotherapists specialized in intensive care, which appears to have contributed to better adherence to the VAP prevention bundle. In contrast, 50% of nurses and 77.77% of physicians were not specialized in intensive care. Previously, greater adherence to preventive measures was observed in units with specialized teams, suggesting that professional qualification positively influences the effectiveness of preventive measures.[5]

In addition, ICU experience was identified as a key factor for adherence to the VAP prevention bundle. All physicians and nurses in this study had more than 36 months of experience in intensive care, which likely facilitated the implementation of preventive measures. However, high workloads can negatively affect adherence to preventive measures.[6] Previous reports have revealed that units with high workloads show higher non-compliance with VAP prevention bundles because of increased professional stress.[4] In the present study, 57.57% of nursing technicians, 36.36% of physiotherapists, and 87.5% of nurses reported holding two employment positions, while 55.55% of physicians reported three, indicating possible overwork that could compromise adherence to preventive measures.

Most professionals reported working 12- to 24-h shifts. Extended work hours, particularly 24-h shifts, contribute to non-compliance with preventive measures owing to physical and mental fatigue. The data showed greater compliance with the protocols during the morning shift, with a decline in adherence in the afternoon and evening shifts. This supports findings in the literature suggesting that fatigue is a determinant factor in poor adherence to preventive measures, reinforcing the concept of a “partial shift” effort, which increased focus at the beginning of the shift.[4,7]

The study showed that 33.33% of nursing technicians were unfamiliar with the concept of VAP, raising concern, because adequate knowledge is crucial for the proper implementation of preventive strategies. Previous studies have identified knowledge gaps among health professionals as a major barrier to the implementation of evidence-based practices. These findings reinforce the importance of continuing education for

multidisciplinary teams to provide the technical and scientific foundation needed to understand and effectively apply these measures.[4,5]

Evidence suggests that educational videos facilitate knowledge retention and review in ICUs, especially when in-person training is limited.[5] Audiovisual tools increase access to information and optimize adherence to VAP prevention bundle measures. Multimodal educational interventions, including interactive quizzes and discussions, promote reflection and experience-sharing, improving outcomes.[4] Thus, our findings are consistent with the current literature, showing increased compliance with the VAP prevention bundle following the multimodal educational intervention.

Neurological patients predominated in all study phases. The patient profile, which often requires prolonged MV, is associated with an increased risk of VAP.[8] MV weaning also showed significant variations between shifts. Compliance increased by 15.18%, showing greater adherence to weaning practices, a key strategy for reducing MV duration and preventing complications. However, the implementation of structured protocols remains necessary. These should include daily sedation interruption and ongoing assessment of the patient for extubation or gradual MV withdrawal, in accordance with a standardized routine.[9]

Adherence to daily sedation interruption improved after the intervention, increasing from 19.75% to 40.54% during the morning shift. Daily awakening has been reported to reduce MV duration and VAP incidence, preventing complications associated with prolonged sedation. Lack of adherence to this practice is frequently attributed

to a culture of deep sedation, which increases ventilator dependency and associated risks.[7,9,10] Daily assessments for extubation and weaning showed a significant improvement in compliance in the morning shift, with a 39.1% increase following the intervention. While this demonstrates the benefits of the intervention, it also reinforces the need for ongoing training and supervision to ensure protocol adherence across all shifts, considering team variability.[9]

Head-of-bed elevation was consistently maintained before and after the intervention, although a slight reduction in compliance was observed: 8.11% in the morning, 15.44% in the afternoon, and 8% in the evening. This practice helps reduce the risk of broncho-aspiration, improve ventilation, and ease respiratory effort. Nonetheless, adherence may be challenged by difficulties in maintaining patient positioning and comfort.[11]

Compliance with oral hygiene increased by 7.8% in the morning, with smaller increases observed in the afternoon (3.43%) and evening (0.06%). Regular oral hygiene with antiseptics is essential, as colonization of the oral cavity precedes pulmonary colonization, and dental biofilms serve as reservoirs for pathogens that can be aspirated. Strict protocols, training, and checklists are recommended to ensure consistent practice across all shifts.[12,13,14]

Cuff pressure compliance significantly varied between shifts, with a slight 2.99% increase in the morning, a drastic 97.29% non-compliance rate in the afternoon, and a 33% increase in the evening. The inconsistencies may be attributed to the absence of scheduled checks in medical records and the nonuse of checklists. The cuff pressure should be maintained between 25 and 30 cmH_2O to prevent microaspiration and reduce the risk of VAP.[11]

In terms of filter replacement, there was 100% non-compliance before the intervention, with a slight reduction to 95.94% after the intervention. The absence of data regarding filter installation dates in medical records or checklists compromises proper monitoring, indicating systemic negligence that increases infection risk. While the 2013 guideline recommends filter replacement every 48 h, the 2024 update allows for a 7-day interval if there is no debris. These findings reinforce the need for continuing education programs and the implementation of protocols and checklists.[5,11,13,15]

Regarding ventilator circuit positioning, morning compliance improved by 15.49%, while afternoon and evening rates declined by 9.43% and 13.48%, respectively. These variations may be related to reduced supervision and higher staff turnover, underscoring the need for continuous training and monitoring.[7,16] Compliance with maintaining a condensate-free ventilator circuit remained high in the morning and afternoon shifts but significantly dropped (21.9%) in the evening shift. These results suggest that while good practices were maintained during the day, they deteriorated at night, highlighting the need for increased supervision and interventions to ensure uniform adherence, because proper maintenance of the ventilator circuit is crucial for preventing VAP.[2,6]

Overall compliance with VAP prevention bundle items increased from 58.23% to 61.02% after the intervention. The most significant improvement was in the morning shift, from 52.24% to 63.21%, while there were declines in the afternoon and evening shifts, from 63.82% to 54.40% and 63.4% to 61.35%, respectively. These findings show overall compliance improvements, especially in the morning, but underscore the need for interventions in the afternoon shift.[7,13] Non-compliance with any component of the bundle can reduce the

effectiveness of prevention strategies and increase the risk of infections.[16,17]

In addition, the number of observations increased from 893 to 1,406 for patients on MV. There was also a 37.84% increase in the number of patients with OTI in the post-intervention stage. This increase not only signals the need for stricter supervision but also indicates an operational burden that may have strained the team and hindered adherence to preventive protocols. Increased ICU workload is a factor that influences bundle compliance.[7] Further, the prevalence of OTI increases VAP risk owing to factors such as a higher microaspiration potential, difficulty in maintaining oral hygiene and mobilization, and greater sedation needs. In contrast, the use of tracheostomy facilitates patient mobilization and hygiene and reduces MV duration, thus decreasing the risk of infection.[1,13] Despite the change in patient profile and increased workload, adherence to the VAP prevention bundle remained positive, demonstrating the effectiveness of the implemented strategy.

5. CONCLUSION

The educational intervention was associated with a modest but statistically significant improvement in adherence to the ventilator-associated pneumonia prevention bundle. Although the increase in overall compliance was limited, the intervention demonstrated potential as an effective strategy to improve adherence to evidence-based practices. However, the short observational period, changes in patient profile, and absence of control for confounding variables limit causal inference. Further studies with longer follow-up and controlled designs are recommended to confirm the sustainability

and clinical impact of educational interventions on adherence to preventive protocols.

Additionally, the short observation period and single-center design may limit the generalizability of the findings.

FUNDING

The authors declare that no financial support was received for the research, authorship, and/or publication of this article.

REFERENCES

1. Sousa LR de Q, Medina LL. Pneumonia associada à ventilação mecânica em unidades de terapia intensiva: revisão integrativa (Ventilator-associated pneumonia in intensive care units: an integrative review). J Infect Control. 2021;10(1):36-42. Available at: http://jic-abih.com.br/index.php/jic/issue/archive

2. Melo LSW, Sá MPBO, Wenceslau EAS, Melo GMG, Sá LEF, Moraes AG, et al. Impacto de modelo de melhoria de assistência à saúde na incidência de infecções relacionadas à assistência, mortalidade e tempo de internamento em pacientes de UTI clínico/cirúrgica (Impact of a healthcare improvement model on the incidence of healthcare-related infections, mortality, and length of stay in clinical/surgical ICU patients). Organisation Mondiale de La Santé; 2021. Available at: https://pesquisa.bvsalud.org/gim/resource/fr/biblio-1407746.

3. Campos C, Moura AD, Silva FP, Almeida JV, Rocha CA, Martins RB, et al. Análise dos critérios diagnósticos de pneumonia associada à ventilação mecânica: estudo de coorte (Analysis of

the diagnostic criteria for ventilator-associated pneumonia: a cohort study). Rev Bras Enferm. 2021;74. Available at: https://www.scielo.br/j/reben/a/6KjWCFNW7SgsPwgLmWFrs5r/?lang=pt

4. Cavalcante A, Souza PF, Oliveira LM, Santos RM, Almeida JD, Ferreira TS. Pneumonia associada à ventilação mecânica: consequências e mortalidade em uma unidade de terapia intensiva (Ventilator-associated pneumonia: consequences and mortality in an intensive care unit). Rev Eletrônica Acervo Saúde. 2020;44.

5. Montini GR, Silva RS, Oliveira AC, Santos MP, Almeida LM, Costa BF. Adesão ao pacote para prevenção de pneumonia associada à ventilação mecânica em terapia intensiva (Adherence to the prevention package for ventilator-associated pneumonia in intensive care). CuidArte Enferm. 2020;172-80. Available at: http://www.webfipa.net/facfipa/ner/sumarios/cuidarte/2020v2/p.172-180.pdf.

6. Cardoso M, Souza A de. Aplicação de bundle de prevenção de pneumonia em UTI pediátrica (Application of a pneumonia prevention bundle in a pediatric ICU). Rev Enferm UFPE Online. 2021;1-15. Available at: https://pesquisa.bvsalud.org/bvsms/resource/pt/biblio-1145767.

7. Silva KB, Oliveira JR, Santos MP, Almeida LM, Costa BF, Ferreira TS. Conhecimento dos Enfermeiros Intensivistas de um Hospital Público sobre Despertar Diário: relato de experiência (Knowledge of intensive care nurses at a public hospital about

daily awakening: an experience report). Research, Society and Development. 2021;10(12). Available at: https://www.researchgate.net/publication/354856818_Conhecimento_dos_Enfermeiros_Intensivistas_de_um_Hospital_Publico_sobre_Despertar_Diario_relato_de_experiencia.

8. Oliveira S, Costa LP, Almeida JR, Santos EF, Silva MT, Ferreira AG, et al. O impacto de um programa de melhoria contínua na redução da incidência de PAV na UTI Adulto de um Hospital Público no interior da Amazônia (The impact of a continuous improvement program on reducing the incidence of VAP in the Adult ICU of a Public Hospital in the Amazon). Braz J Health Rev. 2021;4(1):272-81. Available at: https://ojs.brazilianjournals.com.br/ojs/index.php/BJHR/article.

9. Lima J de, Santos AM, Ferreira BF, Oliveira SR, Almeida TP, Costa LM, et al. Lista de verificação para gerenciamento do despertar diário de pacientes críticos (Checklist for managing the daily awakening of critically ill patients). Rev Bras Ter Intensiva. 2019;31(3):318-25. DOI: 10.5935/0103-507X.20190057. Available at: https://creativecommons.org/licenses/by/4.0/.

10. Brasil. Programa de Apoio ao Desenvolvimento Institucional do Sistema Único de Saúde (Proadi-SUS). Ministério da Saúde; 2021. Available at: https://www.gov.br/saude/pt-br/acesso-a-informacao/acoes-e-programas/proadi-sus.

11. Associação de Medicina Intensiva Brasileira (AMIB), Sociedade Brasileira de Pneumologia e Tisiologia (SBPT). Orientações práticas de ventilação mecânica interativo (Practical guidelines for interactive mechanical ventilation). Rio de

Janeiro: Universo DOC; 2024. Available at: https://amib.org.br/amib-e-sbpt-lancam-edicao-atualizada-das-orientacoes-praticas-em-ventilacao-mecanica/

12. Chicayban LM, Terra ELVS, Ribela JS, Barbosa PF. Bundles de prevenção de pneumonia associada à ventilação mecânica: a importância da multidisciplinaridade (Bundles for the prevention of ventilator-associated pneumonia: the importance of multidisciplinary care). Biológicas & Saúde. 2017;7(25). Available at: https://www.researchgate.net/publication/321447182_bundles_de_prevencao_de_pneumonia_associada_a_ventilacao_mecanica_a_importancia_da_multidisciplinaridade.

13. Franco JB, Jales SMCP, Zamboni CE, Fujarra FJC, Ortegosa MV, Guardieiro PFR, et al. Higiene bucal para pacientes intubados sob ventilação mecânica assistida na unidade de terapia intensiva: proposta de protocolo (Oral hygiene for intubated patients under assisted mechanical ventilation in the intensive care unit: a protocol proposal). Arq Méd Hosp. Fac. Cienc. Méd., Santa Casa, São Paulo. 2014;59(3):126-31. Available at: https://arquivosmedicos.fcmsantacasasp.edu.br/index.php/AMSCSP/article/view/196/206

14. Alecrim RX, Taminato M, Belasco AG, Barbosa DA, Kusahara DM, Fram D. Boas práticas na prevenção de pneumonia associada à ventilação mecânica (Good practices in the prevention of ventilator-associated pneumonia). Acta Paul Enferm. 2019;32(1):11-7. Available at: https://www.scielo.br/j/ape/a/xRV5hfbjNNkkMRcsxcGS7Tb/abstract/?lang=pt#.

15. Associação de Medicina Intensiva Brasileira (AMIB). Diretrizes Brasileiras de Ventilação Mecânica. Diretriz Brasileira de Ventilação Mecânica. São Paulo: AMIB; 2013. v. I, p. 140.

16. Martinez BP, Marques TI, Santos DR, Silva VS, Nepomuceno Júnior BR, Alves GAA, et al. Influência de diferentes graus de elevação da cabeceira na mecânica respiratória de pacientes ventilados mecanicamente (Influence of different degrees of head elevation on the respiratory mechanics of mechanically ventilated patients). Rev Bras Ter Intensiva. 2015;27(4):347-52. Available at: https://www.scielo.br/j/rbti/a/X5nJtdk3TDMHjYVHzqsTXjJ/

17. Drakulovic MB, Torres A, Bauer TT, Nicolas JM, Nogué S, Ferrer M. Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: a randomized trial. Lancet. 1999;354(9193):1851-8. DOI: 10.1016/S0140-6736(98)12251-1.

Table 1. Sociodemographic characteristics of study participants. Porto Velho, RO, Brazil. July 2024. n = 62

Variables	Professionals			
	Physicians	**Nurses**	**Physiotherapists**	**Nursing technicians**
Sex	n (%)	n (%)	n (%)	n (%)
Female	4 (44.4)	8 (100)	8 (72.7)	32 (72.7)
Male	5 (55.5)	0 (0)	3 (27.2)	1 (27.2)
Age				

25–35 years	3 (33.3)	6 (75)	7 (63.6)	9 (63.6)
36–45 years	3 (33.3)	2 (25)	3 (27.2)	12 (27.2)
>46 years	3 (33.3)	0 (0)	1 (9)	12 (9.0)
How long ago did you complete your undergraduate education?				
<24 months	0 (0)	0 (0)	2 (3.2)	3 (3.2)
Between 24 and 36 months	0 (0)	0 (0)	0 (0)	0 (0)
>36 months	9 (100)	8 (100)	9 (100)	33 (100)

Table 2. Distribution of professional characteristics by participant category. Intensive Care Unit. Porto Velho, RO, Brazil, July 2024. n = 62

Variables	**Professionals**			
	Physicians	**Nurses**	**Physiotherapists**	**Nursing technicians**
Length of ICU stay	n (%)	n (%)	n (%)	n (%)
<12 months	0 (0)	0 (0)	2 (18.8)	0 (0)
Between 12 and 36 months	0 (0)	0 (0)	0 (0)	14 (42.4)
>36 months	9 (100)	8 (100)	9 (81.8)	19 (57.5)
Are you specialized in intensive care?				

Yes	2 (22.2)	4 (50)	7 (63.6)	♦
No	7 (77.7)	4 (50)	4 (36.3)	♦
How many employment positions do you currently hold?				
One	3 (33.3)	1 (12.5)	3 (27.7)	14 (42.4)
Two	1 (11.1)	7 (87.5)	4 (36.3)	19 (57.5)
Three	5 (55.5)	0 (0)	4 (36.3)	0 (0)
Do you know what VAP* is?				
Yes	9 (100)	8 (100)	11 (100)	22 (66.6)
No	0 (0)	0 (0)	0 (0)	11 (33.3)

VAP*: Ventilator-associated pneumonia.

Table 3. Description of first-stage observations by bundle item and compilation of all compliant, non-compliant, and contraindicated items recorded across the morning, afternoon, and evening shifts over a 7-day period. Porto Velho, RO, Brazil, July 2024. (Continued)

MORNING				
Observed practices	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**
Checklist item	**n (%)**	**n (%)**	**n (%)**	**n (%)**
OTI*/tracheostomy weaning	17 (36.1)	15 (31.9)	15 (31.9)	47 (100)

Daily sedation weaning	9 (19.7)	16 (34.4)	22 (46.8)	47 (100)
Daily patient assessment for extubation and weaning	21 (44.6)	26 (55.3)	0 (0)	47 (100)
Head-of-bed elevation	47 (100)	0 (0)	0 (0)	47 (100)
Oral hygiene	30 (63.8)	17 (36.1)	0 (0)	47 (100)
Cuff pressure of 25–30 cmH_2O	24 (51)	23 (48.9)	0 (0)	47 (100)
Filter replacement every 48 h or in case of debris	0 (0)	47 (100)	0 (0)	47 (100)
Proper ventilator circuit positioning	34 (72.3)	13 (27.6)	0 (0)	47 (100)
Condensate-free ventilator circuit	39 (82.9)	8 (17.2)	0 (0)	47 (100)
Total	**221 (52.2)**	**165 (39)**	**37 (8.7)**	**423 (100)**
AFTERNOON				
Practices observed	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**
Checklist item	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Cuff pressure	8 (17)	39 (82.9)	0 (0)	47 (100)

Head-of-bed elevation	46 (97.8)	1 (0.2)	0 (0)	47 (100)
Oral hygiene	13 (27.6)	34 (72.3)	0 (0)	47 (100)
Ventilator circuit positioning	40 (85.1)	7 (1.4)	0 (0)	47 (100)
Condensate-free ventilator circuit	43 (91.4)	4 (0.8)	0 (0)	47 (100)
Total	**150 (63.8)**	**85 (36.1)**	**0 (0)**	**235 (100)**
EVENING				
Observed practices	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**
Checklist item	**n (%)**	**n (%)**	**n (%)**	**n**
Cuff pressure	1 (2.1)	46 (97.8)	0 (0)	47 (100)
Head-of-bed elevation	47 (100)	0 (0)	0 (0)	47 (100)
Oral hygiene	14 (29.7)	33 (70.2)	0 (0)	47 (100)
Ventilator circuit positioning	43 (91.4)	4 (8.5)	0 (0)	47 (100)
Condensate-free ventilator circuit	44 (93.6)	3 (6.3)	0 (0)	47 (100)
Total	**149 (63.4)**	**86 (36.5)**	**0 (0)**	**235 (100)**
Periods observed	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**

Shifts	n (%)	n (%)	n (%)	n (%)
Morning	221 (52.2)	165 (39)	37 (8.7)	423 (47.3)
Afternoon	150 (63.8)	85 (36.1)	0 (0)	235 (26.3)
Evening	149 (63.4)	86 (36.5)	0 (0)	235 (26.3)
Total	**520 (58.2)**	**336 (37.6)**	**37 (4.1)**	**893 (100)**

OTI(*): Orotracheal intubation.

Table 4. Description of third-stage observations by bundle items and compilation of all compliant, non-compliant, and contraindicated items recorded across the morning, afternoon, and evening shifts over a 7-day period. Porto Velho, RO, Brazil, September 2024. (Continued)

MORNING				
Practices observed	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**
Checklist item	**n (%)**	**n (%)**	**n (%)**	**n (%)**
OTI*/tracheostomy weaning	38 (51.3)	17 (22.9)	19 (25.6)	74 (100)
Daily sedation weaning	30 (40.5)	25 (33.7)	19 (25.6)	74 (100)
Daily patient assessment for extubation and weaning	62 (83.7)	12 (16.2)	0 (0)	74 (100)
Head-of-bed elevation	68 (91.8)	6 (8)	0 (0)	74 (100)

Oral hygiene	53 (71.6)	21 (28.3)	0 (0)	74 (100)
Cuff pressure 25–30 cmH_2O	40 (54)	34 (45.9)	0 (0)	74 (100)
Filter replacement every 48 h or in case of debris	3 (4)	71 (95.9)	0 (0)	74 (100)
Proper ventilator circuit positioning	65 (87.8)	9 (12.1)	0 (0)	74 (100)
Condensate-free ventilator circuit	62 (83.7)	12 (15)	0 (0)	74 (100)
Total	**421 (63.2)**	**207 (31)**	**38 (5.7)**	**666 (100)**
AFTERNOON				
Practices observed	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**
Checklist item	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Cuff pressure	2 (2.7)	72 (97.2)	0 (0)	74 (100)
Head-of-bed elevation	61 (82.4)	13 (17.5)	0 (0)	74 (100)
Oral hygiene	23 (31)	51 (69.8)	0 (0)	74 (100)
Ventilator circuit positioning	56 (75.6)	18 (24.3)	0 (0)	74 (100)
Condensate-free ventilator circuit	68 (91.8)	6 (8.1)	0 (0)	74 (100)

Total observations	**210 (56.7)**	**160 (43.2)**	**0 (0)**	**370 (100)**
EVENING				
Practices observed	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**
Checklist item	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Cuff pressure	26 (35)	48 (65)	0 (0)	74 (100)
Head-of-bed elevation	68 (92)	6 (8)	0 (0)	74 (100)
Oral hygiene	22 (29.7)	52 (70.2)	0 (0)	74 (100)
Ventilator circuit positioning	58 (78)	16 (22)	0 (0)	74 (100)
Condensate-free ventilator circuit	53 (71.6)	21 (28.3)	0 (0)	74 (100)
Total	**227 (61.3)**	**143 (38.6)**	**0 (0)**	**370 (100)**
Periods observed	**Compliant**	**Non-compliant**	**Contraindicated**	**Total observations**
Shifts	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Morning	421 (63.2)	207 (31)	38 (5.7)	666 (47.3)
Afternoon	210 (54.4)	160 (45.1)	0 (0)	370 (26.3)
Evening	227 (61.3)	143 (38.6)	0 (0)	370 (26.3)
Total	**858 (61)**	**510 (36.2)**	**38 (2.7)**	**1.406 (100)**

OTI(*): Orotracheal intubation.

Table 5. Description of observations of patients on mechanical ventilation over a 7-day period, organized by study stage and categorized according to the type of ventilator circuit connection used. Porto Velho/RO, 2024.

Stage	OTI*	Tracheostomy	Total
	n (%)	n (%)	n (%)
Pre-intervention	8 (16.3)	41 (83.6)	49 (100)
Post-intervention	39 (54.1)	33 (45.8)	72 (100)

OTI(*): Orotracheal intubation.

[1] ORCID: https://orcid.org/0000-0002-5185-0473. E-mail: acesse o artigo original para visualizar o e-mail

[2] E-mail: acesse o artigo original para visualizar o e-mail

[3] ORCID: https://orcid.org/0009-0003-4049-8691. E-mail: acesse o artigo original para visualizar o e-mail

[4] ORCID: https://orcid.org/0000-0002-8676-3898. E-mail: acesse o artigo original para visualizar o e-mail

[5] ORCID: https://orcid.org/0009-0007-7680-3941. E-mail: acesse o artigo original para visualizar o e-mail

[6] E-mail: acesse o artigo original para visualizar o e-mail

[7] ORCID: https://orcid.org/0000-0003-4876-503X. E-mail: acesse o artigo original para visualizar o e-mail