

Development and Validation of an Oral Hygiene Standard Operating Procedure for Professionals Working in Intensive Care Units

Desarrollo y Validación de un Procedimiento Operativo Estándar de Higiene Oral para Profesionales que Trabajan en Unidades de Cuidados Intensivos

Raíssa Barreto Tavares; Geórgya Mayara Travasso Torres; Larissa Rodrigues Magalhães; Michell André Andrade da Silva; Mirela Godoi Nunes de Oliveira; Fabiana Moura da Motta Silveira & Livia Barboza de Andrade

BARRETO, T. R.; TRAVASSO, T. G. M.; RODRIGUES, M. L.; ANDRADE, DA S. M. A.; GODOI NUNES, DE O. M.; DA MOTTA, S. F. M. & BARBOZA, DE A. L. Development and validation of an oral hygiene standard operating procedure for professionals working in intensive care units. *Int. J. Odontostomat.*, 19(1):92-98, 2025.

ABSTRACT: This study aimed to develop and validate a standard operating procedure (SOP) for oral hygiene (OH) targeting professionals working in intensive care units (ICU). This methodological study comprised four stages: 1) an integrative literature review that included and analyzed the main studies related to the topic, 2) the review results informed the development of an SOP for OH to ICU professionals, 3) final SOP version was created via a series of meetings until consensus was reached, and 4) SOP was assessed and validated using a Likert scale questionnaire. Twenty-eight articles informed the development of the SOP by clarifying the definition of procedures, materials, and OH approaches in ICU patients. Next, the SOP was presented to 35 professionals, of which 16 responded to the validation survey. Participants were dentists, nurses, nursing technicians, physical therapists, physicians, pharmacists, and speech therapists. The survey showed 100% of agreement among the evaluators. This study developed and validated an SOP for OH in the ICU. The SOP might facilitate the ICU routine, optimize the engagement of the patient care team, and prevent systemic diseases associated with poor OH.

KEY WORDS: oral hygiene; oral health; intensive care units; patient care team.

INTRODUCTION

Since the late 19th century, the implementation of intensive care units (ICU) enhanced healthcare quality and reduced mortality worldwide (Costa, *et al.*, 2009). In Brazil, the first ICU was established in São Paulo, contributing to positive health outcomes, and revolutionizing the treatment of critical patients. The multidisciplinary team, initially led by physicians and nurses, evolved to adapt to the needs of specific units, such as cardiac, surgical, medical, burn, oncological, and trauma ICUs (Sá *et al.*, 2022).

The ICU aims to maintain life and recover critical patients, offering technological resources and advanced treatments. However, mortality rates still range between 15 % and 25 % (Aguiar *et al.*, 2021). Patients in the ICU are mostly older adults with cardiovascular complications, pulmonary diseases, and acute infections associated with pre-existing comorbidities (Castro *et al.*, 2020).

Due to limitations imposed by hospitalization, patients rely on the nursing team for essential care, including hygiene and wound care. Concerns about the nature of care provided can be raised by family members. Therefore, having clear communication with the family and a care plan are crucial to avoid misunderstanding. Also, implementing a care plan contributes to preventing adverse events and prioritizes the physical and emotional safety of patients (Villar *et al.*, 2020; Matos *et al.*, 2022).

Oral hygiene (OH) is crucial to maintaining the health and well-being of hospitalized patients. This population is particularly vulnerable to oral problems due to intubation, medications, and stress. Among these patients, the microbial community called biofilm can become pathogenic and facilitate opportunistic infections and pneumonia (Motallaei *et al.*, 2021). Therefore, maintaining OH might be a preventive

Instituto de Medicina Integral Professor Fernando Figueira, Recife (PE), Brazil.

Received: 2024-10-15 Accepted: 2024-11-20

strategy to reduce ventilator-associated pneumonia, one of the main causes of morbidity and mortality in the ICU (Chacko *et al.*, 2017). Furthermore, these additional health issues also increase the hospital costs due to the need of longer hospitalization time (Chacko *et al.*, 2017; Motallaei *et al.*, 2021). Implementing OH protocols by qualified professionals reduce complications and improves healthcare quality.

In Brazil, the permanent health education is a national policy that aims to support the training of the multidisciplinary team to ensure updated, evidence-based, and effective practices (Sade *et al.*, 2020). According to the Law Bill No. 2,776, from 2008, the presence of dentists in the multidisciplinary team of ICUs is mandatory, which emphasizes the importance of personalized care. However, standardized protocols and qualified professionals are lacking.

This study aims to improve oral healthcare in ICUs by developing and validating a standard operating procedure (SOP) for OH. The implementation of this SOP might reduce complications and costs, contributing to improved healthcare quality in ICUs.

MATERIAL AND METHOD

This methodological study was conducted by the hospital dentistry team at Instituto de Medicina Integral Professor Fernando Figueira (IMIP), between February and December 2023. IMIP has a wide physical and digital infrastructure encompassing various healthcare modalities, focusing on ICUs. The SOP was developed according to the available scientific evidence, considering the difficulties presented in the IMIP setting, the materials used for OH, and the management of patients under Mechanical Ventilation (MV).

This study was developed in four stages: 1) a literature review to identify the available scientific evidence on the topic; 2) development of an SOP informed by the review findings and based on the available resources at IMIP; 3) discussion of the SOP with a multidisciplinary group until consensus; and 4) validation of the SOP using a survey applied to specialists. All stages are depicted in Figure 1.

The first stage performed a literature review to gather evidence on the existing OH protocols for patients in ICU. The search retrieved forty-three studies, with 28 being screened in full-text. Details on search strategy, eligibility criteria and databases searched can be found in Figure 3. The synthesis of these studies resulted in a synoptic table for analysis (Fig. 2). The findings of the first stage informed the development of the SOP in the second stage also considering the available resources in the IMIP. Figure 4 shows a simplified flowchart of the SOP main topics. The third stage involved in-person discussion of the SOP in a series of meetings with experienced ICU professionals selected using Jasper criteria (Jasper, 1994). Professionals had various backgrounds, including dentists, physicians, nurses, physiotherapists, pharmacists, and speech therapists. In this stage, the content was discussed and amended according to their suggestions.

The final version of the SOP was sent again to the ICU professionals via email. Lastly, the SOP was validated by specialists (Fig. 1). The specialists were a subset of the same ICU professionals who participated in the previous meeting for consensus. The content of the SOP was analyzed, and an electronic survey (Google Forms) containing a Likert scale was used to express agreement (5 - totally agree, 4 - partially agree, 3 - neither agree nor disagree, 2 - disagree, and 1 - totally disagree).

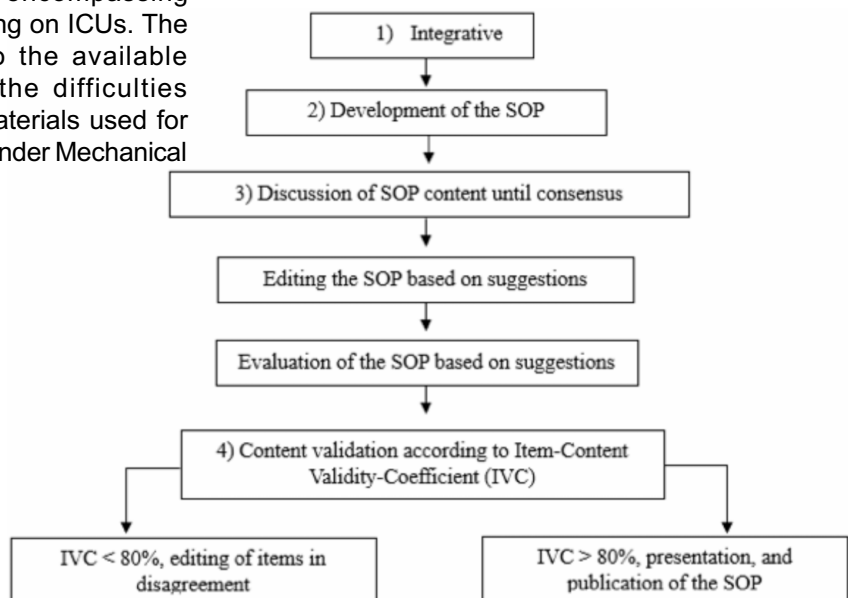


Fig. 1. Flowchart of the study stages.

To calculate the content validity index (CVI), the highest scores (i.e., partially and totally agree) were adopted for each item and divided by the total number of specialists. The acceptable agreement rate for this proportion was $\geq 80\%$ (Alexandre *et al.*, 2011). Responses from specialists were tabulated in Microsoft Excel software (version 2019), and descriptive statistics were performed. The study considered ethical aspects and was approved by the IMIP research ethics committee. Participants were informed about the minimal risks and benefits of the study, which ensured anonymity, voluntariness, and cost exemption.

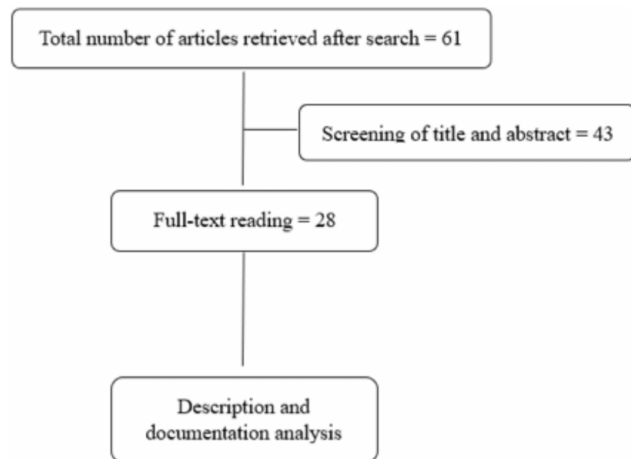


Fig. 2. Flowchart for integrative review.

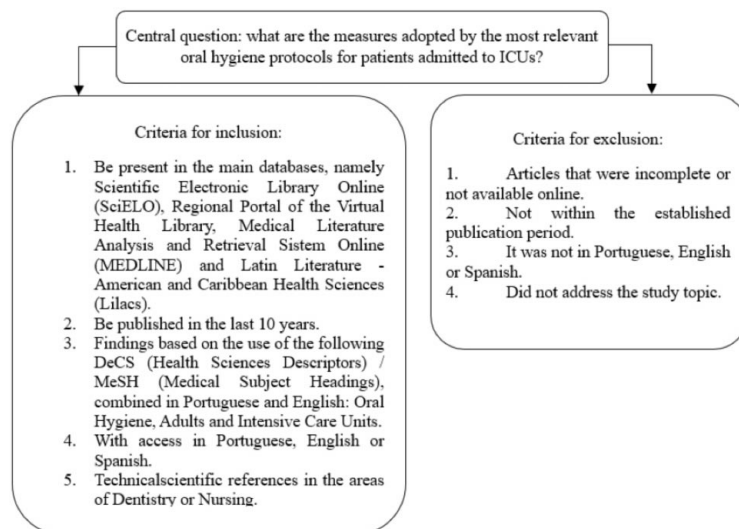


Fig. 3. Criteria for article selection.

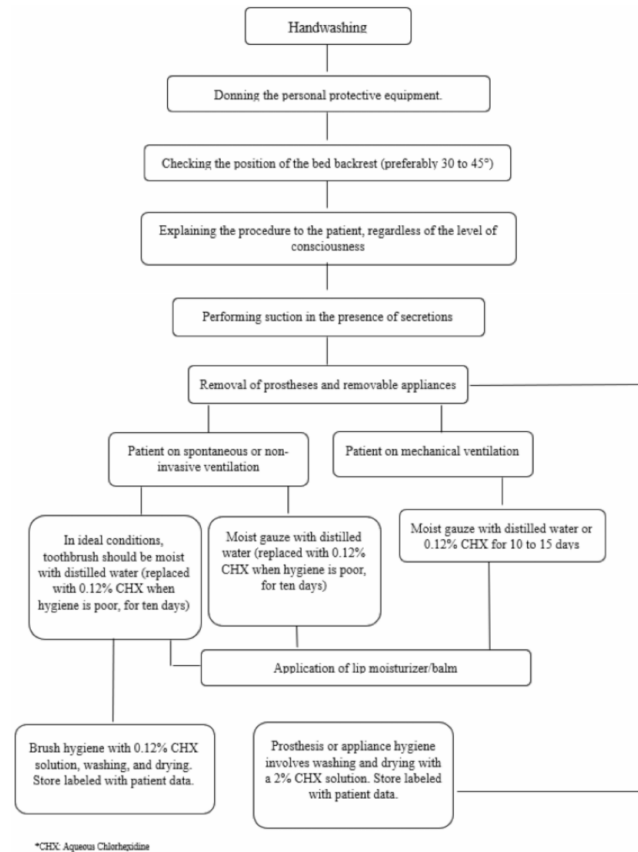


Fig. 4. Flowchart indicating the main SOP topics.

RESULTS

Forty-five professionals were invited by email to participate in meetings to discuss the developed SOP, of which 35 agreed to participate. These participants reached a consensus about its content. Table I shows the sample characterization. From the 35 professionals, 16 were selected as specialists to participate in the SOP validation survey, being three dentists, five nurses, three nursing technicians, one physical therapist, two physicians, one speech therapist, and one pharmacist. Specialists had a mean age of 35 years, had high education (80%), and an average of 4.6 years working in the ICU.

A CVI of 1.0 was obtained, meaning that all responses were rated with “partially” and “totally agree”, which indicates that the SOP was validated by

professionals (Table IIa,b). The SOP was published in 2023 as part of an e-book chapter on the IMIP website. The SOP was introduced in the Infection Prevention and Control manual: guidelines for prevention, control, and treatment of healthcare-associated infections in the hospital environment. This material can be accessed at the following link: <http://higia.imip.org.br/handle/123456789/650>

Table I. Characterization of specialists participating in the SOP validation stage.

Characterization of specialists	
Age	% Percentage
25-30	31 %
31-40	51 %
≥ 41	18 %
Field of study	
Dentistry	19 %
Nursing	31 %
Nursing Technician	19 %
Medicine	13 %
Physical Therapy	6 %
Speech Therapy	6 %
Pharmacy	6 %
Education Level	
Technical education	18 %
Higher education	82 %
Time to complete the course	
1 - 4	38 %
5 - 9	25 %
10 - 19	31 %
20 or over	6 %
Postgraduate level	
Residency	31 %
Specialization	12 %
Master's degree	25 %
Years of experience in ICUs	
1 - 4	56 %
5 - 9	19 %
10 - 19	19 %
20 or over	6 %

ICU: Intensive care unit

Table IIa. Distribution of items in the validation instrument according to the percentage of agreement among specialists.

Content	%
The SOP content aligns with the topic of oral hygiene for patients admitted to ICUs.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	12.5 %
Totally agree	87.5 %
The content enables understanding of the proposed topic.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
The content follows a logical sequence.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
Regarding the "Materials" section, the content correctly incorporates the materials necessary for the oral hygiene of patients.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
Regarding the "Preventive Measures" section, the content correctly incorporates the preventive measures that should be adopted for the oral hygiene of patients.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
Regarding the "Extraoral Hygiene" section, the content correctly and orderly incorporates the necessary steps for the extraoral management of the patient.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
Regarding the "Intraoral Hygiene" section, the content is correct and orderly, and it meets the necessary steps for the intraoral hygiene of the patient.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
The content is clear and correct regarding the management and materials used for patients on spontaneous or non-invasive ventilation.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	12.5 %
Totally agree	87.5 %
The content is clear and correct regarding the management and materials used for patients on invasive mechanical ventilation.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	12.5 %
Totally agree	87.5 %

SOP: Standard operational procedure; ICU: Intensive care unit.

Table IIb. Distribution of items in the validation instrument according to the percentage of agreement among specialists.

Content	
Language	
The SOP has clear and objective language.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	12.5 %
Totally agree	87.5 %
The SOP presents accessible language for the target audience (professionals - dentists, nurses, nursing technicians, physical therapists, speech therapists, pharmacists, and physicians).	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	0 %
Totally agree	100 %
Layout	
The arrangement of items on the pages is organized.	
Totally disagree	0 %
Discordo parcialmente	0 %
Neither agree nor disagree	0 %
Partially agree	12.5 %
Totally agree	87.5 %
The number of pages and the size of the material are adequate.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	12.5 %
Totally agree	87.5 %
Usability	
The SOP allows for easy understanding and assimilation of the content.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
The SOP enables the professional to easily apply its content in clinical practice.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	6.3 %
Totally agree	93.8 %
Relevance	
The SOP is relevant for professionals who oversee and perform oral hygiene for patients admitted to ICUs.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	0 %
Totally agree	100 %
The SOP presents important aspects for the preparation and execution of oral hygiene for patients in ICUs.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	0 %
Totally agree	100 %
The SOP trains the professional in preventive techniques, execution, and completion of the addressed topic.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	12.5 %
Totally agree	87.5 %
The SOP is suitable for use by professionals performing oral hygiene in patients admitted to ICUs.	
Totally disagree	0 %
Partially disagree	0 %
Neither agree nor disagree	0 %
Partially agree	0 %
Totally agree	100 %

SOP: Standard operational procedure; ICU: Intensive care unit.

DISCUSSION

This study developed a standard operating procedure for oral hygiene in adult patients admitted to ICUs. The SOP was the result of four different research phases including literature review, consensus among a multidisciplinary team of ICU professionals, and validation. The SOP aims to aid ICU professionals in implementing and maintaining a standard of care focused on OH, facilitating the care routine, optimizing the engagement of care team, and preventing systemic diseases associated with poor OH. Our initial literature review indicated that the oral cavity is highly prone to be at risk of systemic diseases when hygiene is inadequately maintained. In the ICU, the oral cavity is vulnerable to infections, dryness, trauma-related injuries, and the presence of biofilm (Macedo *et al.*, 2023). Another study evaluated the perception of hospitalized patients on their oral health and showed that periodontal problems were greatly perceived as needing better by more than 60 % of patients (Lima *et al.*, 2011).

Barros *et al.* (2023), emphasize the vulnerability of patients on MV to respiratory diseases. In those situations, microorganisms in the oral cavity can migrate through the equipment and lead to ventilator-associated pneumonia. This scenario is associated with high mortality rates among hospitalized patients. Evidence shows that OH is one of the most effective preventive measures to this condition.

Other studies corroborate our findings and show that ICU professionals face barriers to implementing OH. In addition to the lack of protocols to guide this procedure in terms of materials to be used and hygiene steps to be followed, barriers also encompass occlusal locking by patients or the presence of tubes and cannulas (Silva Junior *et al.*, 2020).

Therefore, literature highlights the need for developing protocols guiding OH for health professionals in ICUs (Cordeiro *et al.*, 2022). These protocols should address the difficulties encountered by professionals. Silva highlights the importance of having a hospital dentist in the multidisciplinary team of the ICU since this professional contributes to the adequacy of the oral cavity and reduces the incidence of associated systemic diseases (Peña *et al.*, 2021).

Rumagihwa and Bhengu (2018), show that 0.12 % aqueous chlorhexidine remains the most effective solution to be used for OH due to its bactericidal and bacteriostatic properties, maintaining the oral microbiota. However, aqueous chlorhexidine needs careful handling. For this reason, Nogueira reinforces that the mechanical removal of debris is the most important step to prevent the proliferation of intraoral pathogens (Nogueira *et al.*, 2017; Pinto *et al.*, 2021)

On the other hand, a review by Klompas recommends the discontinuation of chlorhexidine use for OH due to moderate evidence suggesting an association between this solution and an increased mortality rate in ICUs (Klompas *et al.*, 2022). Therefore, new perspectives on the use of this substance are needed. When indicated, chlorhexidine should be applied with great caution by qualified professionals, always monitoring its concentration, quantity used, and frequency of use.

Furthermore, Schlesener highlights that OH needs to be adapted to the materials available in the service and performed routinely in ICUs to benefit critical patients and improve their quality of life and longevity (Schlesener *et al.*, 2012).

This study has limitations, including the smaller sample size considering the respondents of the validation survey compared with the number of participants participating in the meeting for the SOP consensus. Thus, although a total of 35 professionals participated in the multiprofessional meeting, only 16 responded to the validation survey.

Our results suggest that the proposed SOP contribute to OH promotion in ICUs, in addition to enhancing team engagement. Adequate OH prevents the development of systemic diseases associated with inefficient care. Institutes should implement training focused on EAP and develop further studies on the topic.

BARRETO, T. R.; TRAVASSO, T. G. M.; RODRIGUES, M. L.; ANDRADE, DA S. M. A.; GODOI NUNES, DE O. M.; DA MOTTA, S. F. M. & BARBOZA, DE A. L. Desarrollo y validación de un procedimiento operativo estándar de higiene oral para profesionales que trabajan en unidades de cuidados intensivos. *Int. J. Odontostomat.*, 19(1):92-98, 2025.

RESUMEN: Este estudio tuvo como objetivo desarrollar y validar un procedimiento operativo estándar (POE) para la higiene oral (HO) dirigido a profesionales que trabajan en unidades de cuidados intensivos (UCI). Este estudio metodológico comprendió cuatro etapas: 1) una revisión integradora de la literatura que incluyó y analizó los principales estudios relacionados con el tema, 2) los resultados de la revisión informaron el desarrollo de un POE para la HO para profesionales de la UCI, 3) la versión final del POE se creó mediante una serie de reuniones hasta llegar a un consenso, y 4) el POE se evaluó y validó mediante un cuestionario de escala Likert. Veintiocho artículos informaron el desarrollo del POE al aclarar la definición de procedimientos, materiales y enfoques de HB en pacientes de la UCI. A continuación, el POE se presentó a 35 profesionales, de los cuales 16 respondieron a la encuesta de validación. Los participantes fueron dentistas, enfermeras, técnicos de enfermería, fisioterapeutas, médicos, farmacéuticos y terapeutas del habla. La encuesta mostró un 100 % de acuerdo entre los evaluadores. Este estudio desarrolló y validó un POE para la HO en la UCI. El procedimiento operativo estándar podría facilitar la rutina de la UCI, optimizar la participación del equipo de atención al paciente y prevenir enfermedades sistémicas asociadas con una mala higiene oral.

PALABRAS CLAVE: higiene oral; salud oral; unidades de cuidados intensivos; equipo de atención al paciente.

REFERENCES

- Aguiar, L. M. M. A.; Martins, G. S.; Valduga, R.; Gerez, A. P.; Carmo, E. C.; Cunha, K. C.; Cipriano, G. F. B. & Silva, M. L. Perfil de unidades de terapia intensiva adulto no Brasil: revisão sistemática de estudos observacionais. *Ver. Bras. Ter. Intensiva*, 33(4):624-34, 2021.
- Alexandre, N. M. C. & Coluci, M. Z. O. Validade de conteúdo nos processos de construção e adaptação de instrumentos de medidas. *Cienc. Saude Coletiva.*, 16(7):3061-8, 2011.
- Barros, L. O. G.; Menezes, R. M. G. A. L.; Barros, V. S. G.; Menezes, L. A. G. A. L. & Peixoto, F. B. Alterações bucais em pacientes com ventilação mecânica. *Rev. Eletron. Acervo Saude*, 23(3):1-8, 2023.
- Castro, M. L. M.; Almeida, F. D. C. A.; Amorim, E. H.; Carvalho, A. I. L. C.; Costa, C. C. & Cruz, R. A. O. Perfil de pacientes de uma unidade de terapia intensiva de adultos de um município paraibano. *Enferm. Actual Costa Rica*, (40):419-29, 2020.
- Chacko, R.; Rajan, A.; Lionel, P.; Yadav, B.; Premkumar, J. & Demonstrator, S. Oral decontamination techniques and ventilator-associated pneumonia. *Br. J. Nurs.*, 26(11):594-9, 2017.
- Cordeiro, L. C.; Ribeiro, J. R. V.; Amaral, A. A. G. & Werneck, J. T. A importância da instalação de um protocolo de higiene oral em pacientes entubados: Revisão de literatura. *Int. J. Sci. Dent.*, 1(57):135-46, 2022.

- Costa, R.; Padilha, M. I.; Amanda, L. N.; Costa, E. & Bock L. F. O legado de Florence Nightingale: uma viagem no tempo. *Texto Contexto Enferm.*, 18(4):661-9, 2009.
- Jasper, M. A. Expert: a discussion of the implications of the concept as used in nursing. *J. Adv. Nurs.* 20(4):769-76, 1994.
- Klompas, M.; Branson, R.; Cawcutt, K.; Crist, M.; Eichenwald, E. E.; Greene, L. R.; Lee, G.; Maragakis, L. L.; Powell, K.; Priebe, G. P.; Speck, K.; Yokoe, D. S. & Berenholtz, S. M. Strategies to prevent ventilator-associated pneumonia, ventilator-associated events, and nonventilator hospital-acquired pneumonia in acute-care hospitals: 2022 Update. *Infect Control Hosp. Epidemiol.*, 43(6):687-713, 2022.
- Lima, D. C.; Saliba, N. A.; Garbin, A. J. I.; Fernandes, L. A. & Garbin, C. A. S. A importância da saúde bucal na ótica de pacientes hospitalizados. *Cienc. Saude Coletiva.*, 16(1):1173-80: 2011.
- Macedo, B. S.; Silva, D.; Carrilho, P.; Silva, U. H.; Germano, A. R. S.; Vale, M. C. S. & Seroli, W. O impacto da presença do cirurgião-dentista na UTI. *E-Acadêmica*, 4(2):e1442468, 2023.
- Matos, B. A. B.; Maia, M. C. W.; Souza, V. S.; Ribeiro, M. R. R. & Oliveira, J. L. C. Validação de um procedimento operacional padrão para higienização oral de pacientes intubados e traqueostomizados. *ABCS Health Sci.*, 47:1-12, 2022.
- Motallaei, M. N.; Yazdaniyan, M.; Tebyanian, H.; Tahmasebi, E.; Alam, M.; Abbasi, K.; Seifalian, A.; Ranjbar, R. & Yazdaniyan A. The current strategies in controlling oral diseases by herbal and chemical materials. *Evid. Based Complement. Altern. Med.*, 2021:1-22, 2021.
- Nogueira, J. W. S. & Jesus, C. A. C. Higiene bucal no paciente internado em unidade de terapia intensiva: revisão integrativa. *Rev. Eletr. Enf.*, 19:1-16, 2017.
- Peña, M. S.; Restrepo, L. A. O.; Arroyave, F. A. B. & Brochero, O. F. S. Impact of an educational intervention aimed at nursing staff on oral hygiene care on the incidence of ventilator-associated pneumonia in adults ventilated in intensive care unit. *Invest. Educ. Enferm.*, 39(3):e06: 2021.
- Rumagihwa, L. & Bhengu, B. R. Oral care practices of nurses on ventilated patients in kigali intensive care unit. *Rwanda J. Med. Health Sci.*, 2(2):154-9, 2018.
- Sá, J. D. S.; Rocha, M. A.; Jorge, E. R. R.; Viana, L. C.; Moreira, M. H.; Godoy, J. S. R.; Porto, N. M.; Mourão, P. A.; Teixeira, C. A. B. & Mourão, I. S. S. Segurança do paciente em unidade de terapia intensiva: resgate histórico e reflexões. *Res. Soc. Dev.*, 11(5):1-12, 2022.
- Sade, P. M. C.; Peres, A. M.; Zago, D. P. L.; Matsuda, L. M.; Wolff, L. D. G. & Bernardino, E. Assessment of continuing education effects for nursing in a hospital organization. *Acta Paul Enferm.*, 33:1-8, 2020.
- Silva Junior, A. C.; Xavier, I. P.; Silveira, L. M.; Stabile, A. M.; Cárnio, E. C.; Gusmão, J. L. & Souza, A. L. T. Oral hygiene: Performance of the nursing team in a hospital environment. *Rev. Enferm. Referência*, 51(1):1-8, 2020.
- Schlesener, V. R. F.; Rosa, U. D. & Raupp, S. M. M. O cuidado com a saúde bucal de pacientes em UTI. *Cinergis*, 13(1):73-7, 2012.
- Villar, V. C. F. L.; Duarte, S. C. M. & Martins, M. Segurança do paciente no cuidado hospitalar: uma revisão sobre a perspectiva do paciente. *Ver. Bras. Ter. Intensiva*, 36(12):1-21, 2020.

Corresponding author:

Raíssa Barreto Tavares, MSc
Departament of Dentistry
Instituto de Medicina Integral Professor Fernando Figueira (IMIP)
Rua dos Coelhos, 300
Coelhos, 50070-902
Recife, Pernambuco
BRAZIL

E-mail: raia.b.tavares@gmail.com