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Knowledge and attitudes of nursing professionals regarding oral hygiene in critically ill patients

Conhecimento e atitudes de profissionais de enfermagem sobre higiene bucal em pacientes críticos

Conocimientos y actitudes de los profesionales de enfermería sobre la higiene bucal en pacientes críticos

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Abstract. Objective: to compare the knowledge and attitudes of nursing professionals working in public and private hospitals on oral hygiene in critically ill patients. **Method:** a cross-sectional study carried out in two adult Intensive Care Units, one public and the other one private, between the period of December 2018 and January 2019, using a structured and self-administered questionnaire. **Results:** the knowledge rate of professionals in the public hospital was 76.6% and the attitude was 62.7%, while in the private hospital, these rates were 81.8% and 67.1%, respectively. There were significant differences regarding the existence of a protocol (p <0.006), participation in training (p <0.004), and the use of a toothbrush with soft bristles and suction (p <0.001) in the private hospital. **Conclusion:** the knowled[5]ge level was higher, and the attitudes toward oral hygiene were more positive among nursing professionals at the private hospital compared to the professionals at the public hospital.
Descriptors: Nursing; Health knowledge, Attitudes and practices; Oral Hygiene; Intensive Care Units; Cross-Sectional Studies

Resumo: Objetivo: comparar conhecimentos e atitudes dos profissionais de enfermagem atuantes em hospital público e privado sobre higiene bucal em pacientes críticos. **Método:** estudo transversal, realizado em duas Unidades de Terapia Intensiva Adulto, uma pública e outra privada no período entre dezembro de 2018 e janeiro de 2019 por meio de um questionário estruturado e autoaplicável. **Resultados:** a taxa de conhecimento dos profissionais do hospital público foi de 76,6% e a atitude foi de 62,7%, enquanto no hospital privado essas taxas foram de 81,8% e 67,1%, respectivamente. Houve diferença significativa quanto à existência de protocolo (p< 0,006), participação em treinamento (p< 0,004), uso de escova

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de dentes com cerdas macias e sucção (p< 0,001) no hospital privado. **Conclusão:** o nível de conhecimento foi mais elevado e as atitudes sobre higiene bucal foram mais positivas entre os profissionais de enfermagem do hospital privado em comparação com os profissionais do hospital público.
Descritores: Enfermagem; Conhecimentos, Atitudes e práticas em saúde; Higiene Bucal; Unidades de Terapia Intensiva; Estudos Transversais

Resumen: Objetivo: comparar los conocimientos y actitudes de los profesionales de enfermería que laboran en un hospital público y privado sobre higiene bucal en pacientes críticos. Método: estudio transversal, realizado en dos Unidades de Cuidados Intensivos de Adultos, una pública y otra privada, entre diciembre de 2018 y enero de 2019, mediante un cuestionario estructurado y autoadministrado. Resultados: la tasa de conocimiento de los profesionales del hospital público fue del 76,6% y la actitud del 62,7%, mientras que en el hospital privado estas tasas fueron del 81,8% y 67,1%, respectivamente. Hubo diferencia significativa con respecto a la existencia de protocolo (p <0,006), participación en entrenamiento (p <0,004), uso de cepillo de dientes con cerdas blandas y succión (p <0,001) en el hospital privado. Conclusión: el nivel de conocimiento fue mayor y las actitudes sobre higiene bucal más positivas entre los profesionales de enfermería del hospital privado en comparación con los profesionales del hospital público.
Descriptores: Enfermería; Conocimientos, Actitudes y prácticas de salud; Higiene Bucal; Unidades de Cuidados Intensivos; Estudios Transversales

Introduction

Oral hygiene (OH) is daily nursing care provided to critically ill patients which improves comfort, reduces colonization of the oropharynx by microorganisms and contributes to reducing the incidence of infection, for example, ventilator-associated pneumonia (VAP).[1] National and international guides emphasized that the OH program is one of the strategies used for the prevention of VAP.[1-2] The gold standard of intervention in the oral care of intubated patients includes the observation with assessment tools for oral health, the use of 0.12% chlorhexidine gluconate, and tooth brushing techniques.[1]

Critically ill patients depend entirely on the care provided by health professionals, and the knowledge and attitudes of these professionals directly affect the patients' recovery.[3] Descriptive studies conducted in public and private hospitals, which implemented self-administered questionnaires for data collection, describe that nursing professionals present a lack of knowledge, attitudes and practices regarding OH, and that factors such as insufficient knowledge, little professional experience, training gaps, discomfort, fear of causing adverse events, the type of Intensive Care Unit (ICU) and uncooperative patients contribute to this reality.[3-10]

The first step in changing the attitude of nursing professionals regarding OH is to make them

aware that it is not just a measure of comfort, but a strategy that also qualifies as nursing care, reduces the risk of infection and improves patient results; and that this can be achieved through evidence-based protocols, periodic training and an appropriate care structure.[11] Positive attitudes were strong influencing factors in adhering to infection prevention protocols in hospitals in South Korea, followed by administrative support, types of hospitals and the security measures.[12]

Care quality must be prioritized by health institutions and their professionals. Regardless of whether it is public or private, the health service is expected to provide safe patient care. In this segment, nursing presents a crucial role, since it represents the largest workforce, providing individualized and full-time assistance to the patient, with the goal of administering a rapid recovery.

Researching the knowledge and attitudes regarding OH of nursing professionals who work in ICUs at public and private institutions is essential, as it allows for the identification of opportunities for improvement, developing strategies aimed at qualifying care and also fostering a culture of evidence-based practices. Thus, studies that allow shedding light on the reality of the knowledge and attitudes of professionals in health organizations regarding the practices under question, contribute to a better understanding of the impact that organizational and individual aspects have on the quality of care. Thus, the aim of this study is to compare the knowledge and attitudes of nursing professionals working in public and private hospitals on OH in critically ill patients.

Methods

The cross-sectional study was carried out in two adult ICUs from two health institutions located in the city of Sao Paulo. The ICU of the public hospital (Hospital A) had 42 beds, while the ICU of the private hospital (Hospital B) had 20 beds, with patients of clinical and surgical specialities care profiles. Data collection took place from December 2018 to January 2019. To meet the objective of the present study, a structured and self-administered questionnaire was developed based on national[1] and international[2] guidelines for preventing pneumonia associated with health care and scientific publications on OH.[3-16] This instrument included 37 items and was organized into two parts. The first consisted of 10 items referring to sociodemographic and professional characteristics, and the second

part consisted of 13 items related to knowledge and 13 items related to attitudes regarding OH, which were presented on a 4-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree).

Before application, the instrument was subjected to content validation by eight nurses specialized in Infection Prevention and Control and four nurses specialized in Intensive Care using two rounds of the Delphi technique. The content validity index (CVI) of the instrument was 0.92 and Cronbach's alpha reliability coefficient was 0.88, highlighting the validity and reliability of the instrument.[17]

For operational purposes, the definitions of knowledge and attitude proposed by the literature were used,[14] where knowledge is the awareness of nursing professionals on OH, and attitude is the way nursing professionals think and behave in relation to OH in critically ill patients. "Good knowledge" and "good attitude" was considered to be positive responses when the rate was greater than or equal to 70% (knowledge rate = number of responses "3 = agree" and "4 = totally agree" / total responses of the knowledge questionnaire X 100; attitude rate = number of responses "3 = agree" and "4 = strongly agree" / total responses of the attitude questionnaire X 100).[8]

The list of potentially eligible ICU nursing professionals with their respective work shifts and functions was obtained from the units' nursing coordinator. During the study period, 146 nursing professionals worked in the ICUs. The inclusion criteria were nurses and nursing technicians who had been admitted to work at the institutions for 3 months or more, and who provided direct assistance to the patients. Professionals who had a double bond (Hospital A and B) in the same hospital complex, as well as those who were on sick leave, vacation or any leave from their work activities, were excluded.

The eligible professionals for the study were approached by one of the researchers during their shifts and in their workplaces. Upon accepting to participate in the study, the professional received the self-administered questionnaire, after which they were instructed to answer it and hand it over to the researcher. The average time to complete the questionnaire was approximately 15 minutes.

The questionnaire variables were coded and catalogued in a codebook. A database was prepared in an Excel spreadsheet (Microsoft Office 2008 for Mac), with double entry and data validation in order to identify possible typing errors. Qualitative variables were described by absolute frequencies and percentages, while quantitative variables were described by means and standard deviations, or medians

and quartiles. For the comparison between the proportions of agreement and disagreement in the two types of institutions, as well as for the other qualitative variables, chi-square tests or Fisher's exact tests were used. Age was compared in groups by the Student's t-test for homogeneous variances; the other quantitative variables were compared using the non-parametric Mann-Whitney test. The analyses were performed with the aid of the SPSS program, considering a significance level of 5%.

The research was approved by the Ethics Committee of the institution of study on November 22, 2018, under the protocol No. 3033243. All the precepts of Resolution No. 466/2012 of the National Health Council on research involving human beings were observed.[18] The Term of Informed consent was applied by the researcher before the professional filled out the questionnaire.

Results

Of the 146 ICU nursing professionals, 65 (44.5%) did not participate in the study for the following reasons: 18.4% refused (n = 12), 15.4% were on vacation (n = 10), 15, 4% were on leave (n = 10) and 50.8% were working at Hospitals A and B (n = 33). Of the 81 professionals (55.5%) who agreed to participate in the study, 63 were female (77.8%). The most common level of education was technical education which represented 59.2% of participants (n = 48); and regarding function, 59 participants were nursing technicians (72.8%). The work shifts were distributed homogeneously and, of the total participants, 17 (21%) cited employment in another institution (Table 1).

The existence of a protocol on OH in the sector was stated by 54.3% (n = 44) of the professionals. However, differences were observed between institutions, with a higher rate at Hospital B ($p < 0.006$). This was also observed regarding participation in training on OH: 46.9% (n = 38) answered in the affirmative, but at Hospital B the rate was higher ($p < 0.004$) (Table 1).

Table 1 – Distribution of sociodemographic and professional data of the study participants. São Paulo-SP, 2019. (n=81)

Variables	Type of institution				Total (n= 81)		p-value
	Hospital A (n= 59)		Hospital B (n= 22)				
	n	%	n	%	n	%	
Sex							0,769*
Female	45	76,3	18	81,8	63	77,8	
Male	14	23,7	4	18,2	18	22,2	
Education							>0,99*
Technical education	34	57,6	14	63,6	48	59,2	
University graduate	13	22	4	18,2	17	21	
Postgraduate	12	20,4	4	18,2	16	19,7	
Function							0,298*
Nursing assistant	7	11,9	0	0	7	8,7	
Nursing technician	42	71,1	17	77,3	59	72,8	
Nurse	10	17	5	22,7	15	18,5	
Shift work							0,891
Morning	21	35,6	7	31,8	28	34,6	
Afternoon	19	32,2	8	36,4	27	33,3	
Night	19	32,2	7	31,8	26	32,1	
Employment in another institution?							>0,99*
Yes	12	20,3	5	22,7	17	21	
No	47	79,7	17	77,3	64	79	
OH protocol / routine†?							<0,006*
Yes	28	47,4	16	72,7	44	54,3	
No	27	45,8	3	14,0	30	37	
Uncertain	4	6,8	3	14,0	7	8,7	
OH training†							<0,004
Yes	22	37,3	16	72,7	38	46,9	
No	37	62,7	6	27,3	43	53,1	

Notes: * Fisher's exact test. In the other cases, a chi-square test was used. † OH= Oral Hygiene.

The average age of the participants was 36.6 years (between 20 and 58 years), the average professional experience was 7 years (0.3 - 30) and the average time in the ICU was 6 years (0 , 3 - 25). Regarding the weekly workload, the average was 37.4 hours (30 - 48) (Table 2).

Table 2 – Mean value, standard deviation, minimum and maximum values, and the p-value of the variables age, years of experience, years of experience in ICU and weekly workload of the study participants. São Paulo-SP, 2019. (n=81)

Variable	Type of institution									p-value
	Public (n= 59)			Private (n= 22)			Total (n= 81)			
	Mean	SD	min-max	Mean	SD	min-max	Mean	SD	min-max	
Age (years)	37,1	8,5	20 – 58	35,5	9,3	21 – 53	35,5	9,3	20 – 58	0,470*
Years of experience	7	6	0,3 – 30	7	7	0,3 – 30	7	7	0,3 – 30	0,646†
Years of experience in ICU	6	7	0,3 – 25	5	5	0,3 –18	5	5	0,3 – 25	0,392†
Weekly workload (hours)	37	3,8	30 – 48	37,6	4,4	33 – 48	37,6	4,4	30 – 48	0,880†

Notes: SD: Standard Deviation; min: minimum; max: maximum; ICU= Intensive Care Unit. *Student's t-test; †Mann-Whitney test.

Regarding the knowledge and attitudes about OH of critically ill patients, the categories "agree" and "totally agree", and "disagree" and "strongly disagree", were grouped to allow the comparison between the different institutions (Tables 3 and 4).

When analyzing the rate of positive responses regarding knowledge and attitudes about OH, it was found that the knowledge rate of professionals at Hospital A was 76.6% (588 responses "agree" and "totally agree" / 767 responses), while those at Hospital B were 81.8% (234 responses "agree" and "totally agree" / 286 responses). No statistically significant differences were identified between professionals from Hospital A and B regarding knowledge about OH (Table 3).

Regarding attitudes, at Hospital A the rate of positive responses was 62.7% (481 responses "agree" and "totally agree" / 767 responses) and at Hospital B it was 67.1% (192 responses "agree" and "Totally agree" / 286 responses). There was a statistically significant difference regarding the use of a toothbrush with soft bristles and suction, in which 15.3% (n = 9) of the participants in Hospital A and 54.5% (n = 12) of the participants in Hospital B agreed with this statement (p <0.001) (Table 4).

Table 3 – Distribution of the study participants' responses according to knowledge about OH in critically ill patients. São Paulo-SP, 2019. (n=81)

Affirmative	Type of institution								p-value
	Hospital A (n= 59)				Hospital B (n= 22)				
	Agree and strongly agree		Strongly disagree and disagree		Agree and strongly agree		Strongly disagree and disagree		
	n	%	n	%	n	%	n	%	
1. VAP[+] can be prevented with strategies that include OH.	57	96,6	2	3,4	21	95,5	1	4,5	>0,99*
2. OH[+] must be performed at least once every shift.	56	94,9	3	5,1	19	86,4	3	13,6	0,337*
3. OH[+] includes brushing teeth / dentures.	57	96,6	2	3,4	22	100	0	0,0	>0,99*
4. OH[+] includes gums.	58	98,3	1	1,7	22	100	0	0,0	>0,99*
5. OH [+] includes the tongue.	58	98,3	1	1,7	22	100	0	0,0	>0,99*
6. OH[+] includes hydration of the peribucal and buccal mucosa.	57	96,6	2	3,4	22	100	0	0,0	>0,99*
7. OH[+] includes measuring cuff pressure before the procedure.	42	72,2	19	32,2	18	81,8	4	18,2	0,222
8. OH[+] includes measuring cuff pressure after the procedure.	50	84,7	9	15,3	19	86,4	3	13,6	>0,99*
9. OH[+] includes checking the position of the tube before the procedure.	45	76,3	14	23,7	19	86,4	3	13,6	0,214*
10. OH[+] includes measuring the position of the tube after the procedure.	40	67,8	19	32,2	19	86,4	3	13,6	0,114
11. OH[+] includes subglottic aspiration.	46	78,0	13	22	19	86,4	3	13,6	0,331*

12. In my unit, the evaluation of the oral cavity is done up to 72 hours after admission to the ICU[§].	19	32,2	40	67,8	12	54,5	10	45,5	0,092
13. In my unit, the oral cavity is evaluated by a dental surgeon.	3	5,1	56	94,9	0	0	22	100,0	0,565*

Notes: * comparison with Fisher's exact test. Other comparisons were done with the chi-square test. [†]VAP= Ventilator-Associated Pneumonia; [†]OH= Oral Hygiene; [§]ICU= Intensive Care Unit

Table 4 – Distribution of the responses of the study participants (n = 81) according to attitudes about OH in critically ill patients. São Paulo-SP, 2019

Affirmative	Type of institution								p-value
	Hospital A (n= 59)				Hospital B (n= 22)				
	Agree and strongly agree		Strongly disagree and disagree		Agree and strongly agree		Strongly disagree and disagree		
	n	%	n	%	n	%	n	%	
1. Sometimes I don't have time to perform OH[†].	25	43,4	34	56,6	10	45,5	12	54,5	0,850
2. The lack of material prevents me from performing OH[†].	40	67,8	19	32,2	11	50	11	50	0,140
3. I feel safe to perform HB on a patient on MV[†].	56	94,9	3	5,1	21	95,5	1	4,5	>0,99*
4. I record the performance of OH[†] in the medical records.	50	84,7	9	15,3	19	86,4	3	13,6	>0,99*
5. I use a toothbrush with soft bristles and suction during OH[†].	9	15,3	50	84,7	12	54,5	10	45,5	<0,001
6. I use gauze wrapped in a spatula during OH[†].	48	81,4	11	18,6	15	68,2	7	31,8	0,236*
7. I use 0.12%	43	72,9	16	27,1	17	77,3	5	22,7	0,688

chlorhexidine gluconate during OH†.									
8. I hydrate the peribucal and oral mucosa after OH†.	56	94,9	3	5,1	22	100	0	0,0%	0,563*
9. I measure the cuff pressure before OH†.	21	35,6	38	64,4	7	31,8	15	68,2	0,822
10. I measure the cuff pressure after OH†.	23	39	36	61	6	27,3	16	72,7	0,394
11. I check the position of the tube before OH†.	38	64,4	21	35,6	19	86,4	3	13,6	0,054
12. I check the position of the tube after OH†.	40	67,8	19	32,2	19	86,4	3	13,6	0,114
13. I do subglottic aspiration during OH†.	32	54,2	27	45,8	14	63,6	8	36,4	0,217

Notes: * comparison with Fisher's exact test. Other comparisons were done with the chi-square test; †OH= OH= Oral Hygiene; ‡MV= mechanical ventilation

Discussion

There is a divergence in the literature on significant associations between demographics, professional characteristics and attitudes towards OH in critically ill patients. A previous study did not confirm this association[5] and another study that described that the level of education, professional experience and training in OH are relevant factors in the nurses' attitudes.[14]

In this study, participants presented similar sociodemographic and professional profiles as reported in previous studies where the majority were female[3,5-8,10,13-14], approximately 37 years of age[5], high school education[6], less than 6 years of professional experience[10,14] and 4 years' experience in the ICU[9]. They also recognize the importance of OH when stating that VAP can be prevented with strategies that include OH. These results are consistent with the literature on the subject.[6-8,10,13-14]

The execution of OH suffers the interference of individual factors, for example, the level of knowledge and time of professional experience, and organizational factors, such as the offer of training,

a sufficient number of professionals and adequate inputs[19]. Therefore, knowing these factors help identify barriers and outline corrective strategies that can improve the knowledge, attitudes, and practice of OH in critically ill patients.

Regarding the presence of protocols on OH, there was a significant difference between the institutions, and this aspect was more affirmed by professionals from Hospital B. Research carried out in hospitals in India[9] and Saudi Arabia[10] pointed out that the adherence to the OH protocol was 65% on average.

Care protocols are useful in the field of nursing. It is a tool based on scientific evidence that helps to reduce variations in the care provided to the patient, providing greater satisfaction for the nursing staff, greater safety for the patient, in addition to having an educational purpose.[20]

With regard to participation in training on OH, there is a significant difference between institutions, with Hospital B presenting better performance than Hospital A. This finding deserves attention, as it suggests that knowledge about OH is obtained empirically, which can result in variations in care and unsafe practices.

Permanent education is a determining factor to increase the theoretical framework of professionals and adherence to good practices[16]. In addition, it is provided in the Resolution of the Collegiate Board (RDC) nº. 36 as a strategy to reinforce patient safety practices[21]. Therefore, health services need to provide training that is linked to the work process, in sufficient quantity and at regular intervals to develop and maintain the competence of its employees. It is essential that healthcare professionals are aware and up to date on best practices, demonstrating to the service users that they are continuously working to ensure that high standards of care are provided.

The prevention of VAP is a common objective of professionals working in the ICU, regardless of whether the service is public or private. Therefore, they need to understand the pathophysiology of VAP and the role of preventive measures - for example, OH - in preventing the transmission of pathogenic microorganisms. Training on the prevention of this type of pneumonia can be given in partnership between professionals from the Infection Control Service, Permanent Education, ICU, and the content must be focused on the needs of the professionals. As teaching-learning strategies for this content, we suggest those that enable meaningful learning, such as problem-based learning (PBL) and realistic simulation.[22]

The international literature points out that the knowledge rates on OH vary from 31.8% to 97.4% [3-4,7-10,14,16], while attitudes and practices vary from 57% to 91% [4-5,8,10,14,16]. In the present study, both hospitals presented adequate levels of knowledge and fragile attitudes towards OH. When compared, the rate of knowledge and self-reported attitudes by professionals at Hospital B were higher than those professionals at Hospital A.

It is noteworthy to point out the fact that even with adequate knowledge, professionals from both hospitals showed fragile attitudes, which may suggest weaknesses in the culture of patient safety in the institutions studied here. The culture of patient safety is the set of values, skills and behavioural patterns that determine the commitment of the service to the management of the health and safety of its patients through the implementation of safe practices and the reduction of incidents.[21] In this context, health service managers are in a better position to induce changes in the attitudes and practices of professionals, which may contribute to the establishment of a culture of patient safety as a prerequisite for assistance.[23]

In this study, approximately half of the professionals at Hospital B know and perform the assessment of the oral cavity within the first 72 hours of the patient's admission to the ICU, while less than half of the participants at Hospital A know and apply this recommendation. Proper assessment of oral health and early intervention usually prevent serious complications before they can compromise therapeutic results.[1] Through the nursing process, professionals are able to recognize and intervene early on changes in patients' basic human needs.

According to the recommendation guide of the National Health Surveillance Agency (*Agência Nacional de Vigilância Sanitária* - ANVISA), colonization of the oral cavity of patients using mechanical ventilation by Gram-negative microorganisms tends to occur between 48 to 72 hours after intubation and, often, periodontal complications, as well as periapical and mucositis occur.[1] Thus, the evaluation of the oral cavity is relevant for the care of these patients.

The presence of a dental surgeon was not considered important by the participants from either hospital, contrasting studies carried out in Ethiopia and Brazil, for which the presence of this type of professional was considered relevant by the nursing teams due to the help in the diagnosis, treatment of complications and guidance on the proper technique of OH.[13-14] However, regardless of the

interdisciplinary collaborative practice, one of the pillars of person-centered care, namely nurses, can and are able to take the lead in this process.[24]

Studies describe several barriers to the performance of OH, the most relevant being the lack of time, lack of materials,[3-5,7,9,25] inadequate proportion between nurses and patients,[6,8,12] lack of patient cooperation,[4] training gaps,[3,10] perception of the procedure as unpleasant,[10,25] and fear of dislocating the endotracheal tube.[9] In the present study, the lack of time and materials were the most significant in both hospitals.

As for the materials used OH, there was a significant difference between institutions regarding the use of a soft-bristled toothbrush and suction for OH. Similar to previous studies, [6,10,13] the use of this material is not yet fully implemented in services, showing that nursing professionals perform oral care that is not based on evidence.[1]

Regarding the registration of the procedure in the patient's medical record, the present research points out that the nursing professionals from both hospitals adopt this practice - a contrasting result as reported in the literature, in which the registration rate varied between 46% to 73.8%.[6,8,26] It is noteworthy that this aspect is among the best care practices and its adoption reflects the quality of care.

In agreement with a previous study, 8 it is noted that most nursing professionals from Hospitals A and B do not implement the recommendation to evaluate the cuff before and after conducting OH, nor do they perform subglottic aspiration according to a practice strongly recommended by a national guide, [1] reinforcing the need for an evidence-based protocol and strengthening the safety culture in the studied hospitals.

This study presented limitations such as the use of a self-administered questionnaire, which, despite being considered valid and reliable by specialists, does not reflect the real circumstances in which it was answered, as the professional practice has not been evaluated. Other limitations include the comparison between institutions with different realities and also to the study design, which compromises the external validity, allowing the identification of knowledge and attitudes only in a certain time frame.

Conclusion

The nursing professionals of the studied ICUs have adequate knowledge and fragile attitudes about OH in critically ill patients. Hospital B professionals had a better rate of knowledge and attitudes when compared to Hospital A professionals.

Participation in training, the presence of an OH protocol and the use of a toothbrush with soft bristles and suction presented statistical significances between institutions, with the nursing professionals at Hospital B presenting more affirmative responses to these aspects.

It is recommended that ICUs reinforce the culture of patient safety through the implementation of guidelines based on scientific evidence regarding OH, periodic provision of permanent education programs, and provision of appropriate inputs so professionals can perform OH effectively.

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