

HOLISTIC ORAL CARE FOR CRITICALLY ILL CHILDREN: KNOWLEDGE AND PRACTICES OF INTENSIVE CARE UNIT NURSES

Moustafa A. AL-SHAMMARI ¹

AL-Qasim Green University, Iraq

Sura Obayes Radhi AL-QAYYIM ²

University of Babylon , Iraq

Abstract:

Objective: This research aims to assess the knowledge, perceptions, practices, and education of pediatric critical care nurses regarding oral care for critically ill children. The study addresses the existing gap in evidence-based oral care in this population and emphasizes the importance of understanding these factors for the development of effective oral hygiene practices in pediatric critical care settings.

Methods: A descriptive cross-sectional study was conducted between October 2022 and March 2023 in Babylon Governorate. Four hospitals located in Hillah City, Babylon Province, were selected as the study sites. The sample included nurses working in specific critical care units within these hospitals, with a total of 170 nursing personnel participating. Data collection involved the distribution of questionnaires to the nurses, and statistical analysis was performed using SPSS software. The study obtained the necessary administrative and ethical approvals for data collection.

Results: The sample consisted of 170 intensive care unit nurses, selected through stratified sampling based on gender (105 female and 65 male). Recruitment for the study commenced in February 2023. The mean score for oral health knowledge was moderate (2.14), However, the oral care practice score was good (2.02). No significant differences were observed in comprehensive mouth care scores based on age and educational qualification. Nevertheless, a significant difference was found in the mean score for complete oral care between male and female nurses (18.37 vs. 17.85, $p = 0.021$). Moreover, knowledge and practice scores varied significantly based on years of experience.

Conclusions: This study provides valuable insights into the knowledge, perceptions, and practices of intensive care unit nurses regarding oral care. Implementation of standardized

 <http://dx.doi.org/10.47832/2717-8234.18.29>

¹  moustafa.ali@biotech.uoqasim.edu.iq

²  sri.hamad.nurh69@student.uobabylon.edu.iq



oral care protocols, along with adequate resources and support, can contribute to enhancing comprehensive mouth care in intensive care units.

Keywords: *Comprehensive Oral Care, Critically Ill Children, Intensive Care Unit, Icu Nurses, Knowledge, Perception, Practice*

Introduction:

To maintain oral health throughout all stages of a child's development, oral hygiene must be provided. When faced with a significant illness and the necessary treatment, a child's oral cavity is challenged by a disruption to regular protective processes and frequently becomes dysfunctional as a result.¹.

Children that are critically ill include a wide range of patients. Numerous kids, spanning in age from infant to adolescence, are pre-morbidly healthy, while others have an acute episode linked to a prior condition. While some really ill children require complex and invasive respiratory, circulatory, and renal care, others merely require postoperative monitoring.².

When a child is sleeping or intubated, their ability to speak, eat, and drink is reduced, as is their ability to move around the mouth. Because it sits on the gingivae rather than the teeth when a kid is non-dentate, the endotracheal tube creates pressure on the oral cavity. Additionally, the youngster who has had their mouths intubated orally is made to keep them open for extended periods of time. Children regularly experience oxygenation and high-flow oral suctioning, even when they are not intubated, which dries out the mucosa. It is important yet difficult to give optimal dental care as a result to maintain a clean, moist environment³.

Critical illness and the associated post-treatment care can have an effect on systemic health in addition to oral health. The cost, morbidity, and mortality effects of fungal and bacterial pathogens that cause bloodstream and respiratory infections in children requiring critical care are substantial. The relationship between poor oral health, as reflected by pathogenic oropharyngeal colonization, and hospital-acquired pneumonia, particularly ventilator-associated pneumonia, has been demonstrated by robust patient critical care clinical research (VAP). These infrequently curable diseases place a significant burden on healthcare systems and are associated with increased death rates, longer hospital admissions, higher rates of morbidity, and more expensive healthcare⁴.

The provision of oral hygiene in critical care is being prioritized more and more by international healthcare organizations, including the Institute of Health Improvement (IHI) and the Centers for Disease Control and Prevention (CDC). Evidence on the effectiveness and acceptability of oral hygiene techniques in pediatric critical care is currently lacking. The adoption of practices for excellent oral hygiene based on scientific evidence may be impacted by the lack of information in the literature about the present knowledge, perception, practice, and education of pediatric critical care nurses about oral care in pediatric critical care patients. ⁵.

The aim of this study was to assess the oral care knowledge, views, behaviors, and education of pediatric critical care nurses. This would provide clinicians with the information they need by properly creating and integrating evidence-based oral care into

pediatric critical care. Results of recruiting were also gathered to see if conducting a countrywide study was possible.

Background

Healthcare professionals are required to handle every aspect of a severely ill child's oral care. Oral care routines, however, are typically governed by custom, personal preferences, product availability, and anecdotal and subjective assessment, claim some authors, rather than being based on evidence-based processes.⁶ Improved oral health is achieved by moisturizing, mechanical, and chemical cleansing. Most people agree that using a toothbrush to brush their teeth and gums is a simple and efficient technique to physically remove plaque and other debris. Despite these recommendations, many critically ill patients with dentate patients only use cotton swabs or foam to clean their teeth. For help with chemical cleansing, people frequently use sodium bicarbonate, chlorhexidine gluconate mouthwash, and fluoride-containing toothpaste. To reduce product interactions, the bulk of studies advises delaying use of chlorhexidine gluconate-containing mouthwash and toothpaste in children older than six years of age.⁷

The utilization of oral health research must be accepted and supported by clinical staff. Descriptive study involved doing a lot of patient and critical care nurse surveys. in Brazilian⁸, in the university hospitals of Iran⁹, in Sweden¹⁰ on their perceptions of oral hygiene services, their education, current behaviors, and the resources available. These patient studies showed that, even while nurses are aware of the need of maintaining excellent oral hygiene practices, they may be hesitant to provide oral care to intubated patients out of fear that they would accidentally extubate the patient. The frequency, needs, and oral care practices varied, and the majority of the patients whose critical care nurses were interviewed did not adhere to an evidence-based oral care protocol. When providing care for critically ill patients, the nurses' descriptions of oral hygiene as a top priority or essential differed. Most of the patient's critical care nurses acknowledged the need for further education and training, and the inability to get sufficient funding had a direct impact on the standard of care provided. Similar results have been seen in both pediatric and neonatal intensive care unit¹¹, the pediatric intensive care unit¹² research; However, little study has been conducted on pediatric critical care nurses. No questionnaire has, in addition, addressed concerns that are pertinent to the pediatric critical care community, particularly those relating to variances in practice in identifying the developmental stage and clinical condition of the critically ill child.

Methods

Design

This study used a descriptive cross-sectional design to examine the perceptions, practices, and knowledge of intensive care unit nurses in Babylon Governorate about holistic oral care for very sick children.

Study setting

Four hospitals in Hillah City, Babylon Province, were used for the study's execution. The participating facilities were Babylon Maternity and Children Teaching Hospital, Imam Sadiq Teaching Hospital, and Morgan Teaching Hospital, which, respectively, represented pediatric, general, and specialist tertiary healthcare settings.

Sample

The nurses who worked in certain critical care units in the chosen hospitals made up the sample. Participants were divided into groups based on gender and comprised nurses with at least three months of experience working in intensive care units caring for male and/or female patients aged 15 and under.

Sample Size

The number of nurses in the chosen settings was assumed to be on average 302, which was used to calculate the sample size. A total sample size of 170 nurses was chosen, taking into account gender-specific intra-stratified correlations, a 95% confidence level, and a 5% margin of error. The study was described in (Figure 1).



Figure:1 Participant flow.

Data collection

The researcher was there to answer any queries or offer clarifications when the questionnaire was distributed to the nurses in order to collect data. Experts evaluated the instrument's content validity, and a pilot study was carried out with a portion of the sample to validate the Arabic translation of the questionnaire. Based on Cronbach's Alpha, it was found that the instrument had a fair level of dependability.

Statistical analysis

Descriptive statistics, such as mean, range, and standard deviation, were used to show the data after the data were processed using SPSS software. In order to analyze the data, mean differences, confidence intervals, Pearson correlation tests, and t-tests were used. The dependence on self-reported data and the study's limited sample size were its main drawbacks.

Research ethics approval

The University of Babylon, College of Nursing, Higher Studies Committee, as well as the Scientific Research and Ethical Committee of the College of Nursing, all granted administrative clearance for the study. The Babylon Health Office Development and Training Center of the Ministry of Health also granted official clearance. For the purpose of gathering data, formal agreements were made with three hospitals in Hillah City.

Results

Table 1: Social Demographic Characteristics of Nurses (N=170).

Variables	Categories	F	%
Age categories	Young Nurse (20-39 years)	166	97.6%
	Middle Age Nurse (40-65 years)	4	2.4%
	Mean	26.78	
	Std. Deviation	4.197	
Gender of Nurses	Male	75	44.0%
	Female	95	56.0%
Education Qualification	High Nursing school	15	8.8%
	Diploma Graduate	44	25.9%
	Bachelor's Graduate	110	64.7%
	Postgraduate	1	0.6%
Nur. experience/service	< a (1)yr.	33	19.4%
	Nur. Experience 1-2 yrs.	50	29.4%
	Nur. Experience 3-5 yrs.	53	31.2%
	Nur. Experience 6-10 yrs.	27	15.9%
	Nur. Experience 11-15 yrs.	4	2.4%
	> 15 years' experience	3	1.8%
	Mean	2.58	
	Std. Deviation	1.145	
ICU Nur. experience/service	< a (1)yr.	51	30.0%
	Nur. Experience 1-2 yrs.	67	39.4%
	Nur. Experience 3-5 yrs.	45	26.5%
	Nur. Experience 6-10 yrs.	2	1.2%
	Nur. Experience 11-15 yrs.	2	1.2%
	> 15 years' experience	3	1.8%
	Mean	2.09	
	Std. Deviation	0.999	
The number of local training courses that participated for ICU	I Did not get any session ICU training	73	42.9%
	One-session ICU training	66	38.8%
	Two sessions ICU training	17	10.0%
	3 or more sessions ICU training	14	8.2%
	Mean	1.84	
	Std. Deviation	0.915	
Total		170	100.0

f, frequency, Std. Deviation, the scores standard-deviation

Social and demographic information about the 170 nurses who took part in the study is included in Table 1. The sample's average age was 26.78 years, with 56.0 percent of individuals being female. Participants had 64.7% of graduates with a bachelor's degree. possessed 2.58 years of work experience and 2.09 years of ICU experience. ICU-related training courses were taken on average 1.84 times each year.

Table 2: Distribution of Grade About Knowledge concerning comprehensive oral care among participants N=170

No.	Items	f	%	M	SD	P-V
"Comprehensive oral care"						
O.H.K.1:	Others	12	7.1%			
	The process of suctioning secretions from the endotracheal tube and applying a moisturizer to the lips.	26	15.3%			
	Brushing teeth, suctioning the endotracheal tube, and hydrating the mouth are oral assessments.	102	60.0%			
	Brushing teeth and doing endotracheal suctioning.	7	4.1%			
	using oral hygiene techniques such tooth brushing, suctioning, and moisturizing the oral cavity.	23	13.5%			
"Less significant tissues in assessing oral health status"						
O.H.K.2:	Others	125	73.6%			
	Trachea	45	26.5%			
"Indicators of poor oral hygiene"						
O.H.K.3:	Others	21	12.4%			
	Bleeding Gums	83	48.8%			
	Dental Plaque	66	38.8%			
	Bleeding Gums + Dental Plaque	9	5.3%			
"Prevalent microorganisms in the oral cavity"						
O.H.K.4:	The gram-positive streptococci and microorganisms commonly found in dental infections.	13	7.6%			
	Gram-negative streptococci and oral pathogens.	15	8.8%			
	One and two	97	57.1			
	Various types of pathogen strains.	45	26.5%			
"Medications with negative effects on oral health"						
O.H.K.5:	Yes	151	88.8%			
	No	19	11.2%			
"Drugs disrupting salivary production"						
O.H.K.6:	Others	59	34.7%			
	Sympathomimetic	111	65.3%			

"Respiratory nosocomial infection associated with inadequate oral care"						
O.H.K.7:	Don't know	86	50.6%			
	Organisms	19	11.2%			
	Sores/ulcers	4	2.4%			
	TB/Bronchitis	9	5.3%			
	Pneumonia	52	30.6%			
"Inclusion of oral care in basic nursing education"						
O.H.K.8:	Yes	44	25.9%			
	No	126	74.1%			
"Instruction on oral health care since assignment to the unit"						
O.H.K.9:	Yes	33	19.4%			
	No	137	80.6%			
"Desire for additional training or updates on oral health care"						
O.H.K.10:	Yes	154	90.6%			
	No	16	9.4%			
OHK				2.14	0.461	0.000

f, frequency; |OHK|, Oral Health Care/Hygiene Knowledge (ITEMS) see details in appendix (E). *M* represents the mean, *SD* the scores standard-deviation, *t* refers to the *t*-score value, *p*-value (with a significance level of less than 0.05), and *df* refers to the degree of freedom.

The information in the table above sheds light on the ICU nurses' degree of expertise in providing complete oral care. Of the 170 participants, 60.0% correctly identified suctioning the endotracheal tube, moisturizing the mouth, and brushing teeth as oral examinations (O.H.K.1). However, there are such gaps in knowledge, as only 25.9% of the nurses were aware that oral care was included in the foundational nursing education (O.H.K.8), and only 19.4% had received instruction in oral health care after being assigned to the unit (O.H.K.9). Additionally, the sample's mean |OHK| score was 2.1459, which is substantially below the highest possible score and indicates a rather low degree of knowledge ($t = -80.716, df = 169, p .001$).

Table 3: Distribution of grades among ICU nurses about mouth washes, equipment, and frequency of performing comprehensive mouth care N=170.

Items	1	2	3
"Toothbrush cleansing tool"	13.5%	40.6%	45.9%
"Toothpaste cleansing tool"	10.6%	40.6%	48.8%
"Swab cleansing tool"	31.8%	46.5%	21.8%
"Sterile water cleansing tool"	57.6%	29.4%	12.9%
"Tap water 4.6 cleansing tool"	14.1%	35.9%	50%
"Normal saline cleansing tool"	60%	22.4%	17.6%
"Glycothymoline cleansing tool"	0%	30.6%	69.4%
"Lemon & glycerol cleansing tool"	0%	38.8%	61.2%
"Sodium bicarbonate cleansing tool"	9.4%	48.2%	42.4%
"Hydrogen peroxide cleansing tool"	2.4%	25.3%	72.4%
"Vaseline/lip balm cleansing tool"	35.9%	40.6%	23.5%
"Other (specify)"	0.6%	0.6%	98.8%
N	170		
M	2.02		
SD	0.853		
T	-0.036		
P	0.971		
Df	169		

1, always, 2, rare 3, never; For oral care Practices (ORPR) see appendix (E). *M* represents the mean, *SD* the scores standard-deviation, *t* refers to the *t*- score value, *pvalue* $|a|$ significance level of less than $| 0.05 |$,

The response % distribution for each item is shown in Table (4). 13.5 percent of participants said they always used a toothbrush for ORPR1 (using a toothbrush), 40.6 percent said they used one occasionally, and 45.9 percent said they never did. Similarly, 0.6 percent of individuals in ORPR12 (using lemon and glycerol) claimed often using it, 0.6 percent reported occasionally using it, and 98.8 percent reported never using it. 169 degrees of freedom and a *t*-value of -0.036 with a *p*-value of 0.971, The estimated *p* exceeded sig. (0.05) by more than 1. The 95 percent confidence interval, while the mean difference is - 0.002.

Availability And Use of Mouth Care Protocol In ICU

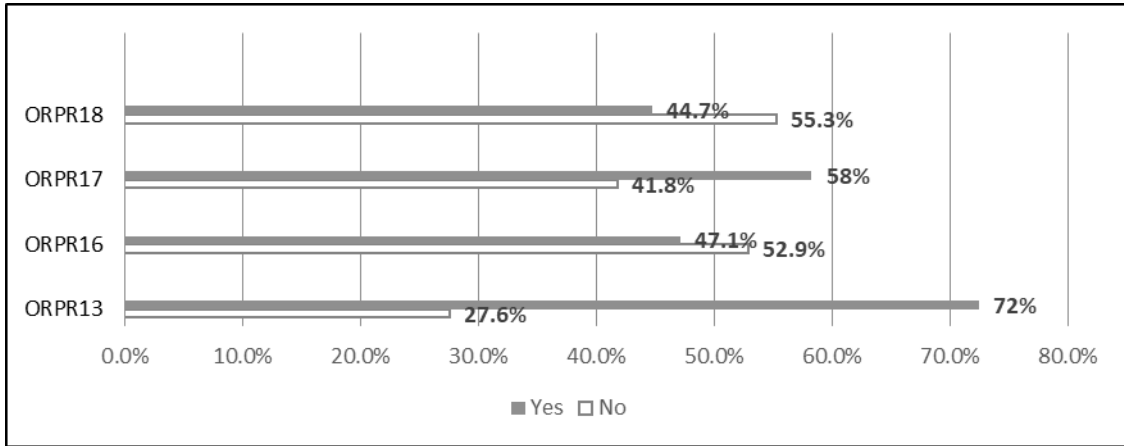


Figure 2 Performing Comprehensive Mouth Care N=170

(The percentage of respondents who indicated "Yes" or "No" to the question "Do you do an oral health examination on a kid on admission?" is shown in Figure 2. Upon a child's admittance, the majority of participants (72.4 percent) indicated that they do conduct an oral health exam, while 27.6 percent indicated that they do not. According to the results, 80 (47.1 percent) of the 170 participants reported utilizing an evaluation tool or guide to gauge the child's oral hygiene, while 90 (52.9 percent) said they had never used one.

The majority of responders (58.2 percent) report having trouble giving kids in their unit routine oral treatment. Based on the findings, it appears that just 44.7% of respondents have an oral care regimen in their unit, while the majority, or 55.3%, do not.

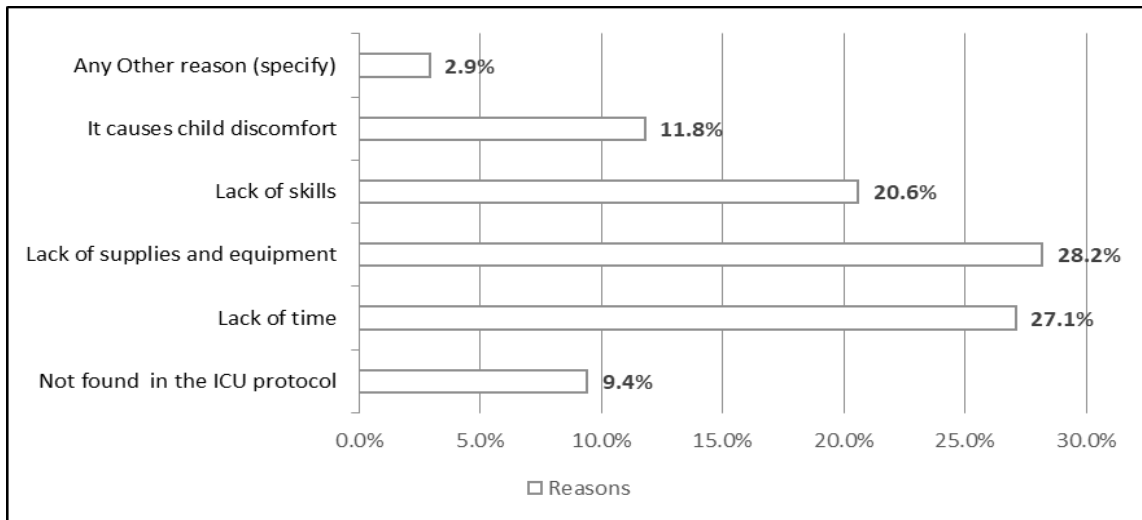


Figure 3: Difficulties Met With Nurses While Doing Comprehensive Mouth Care For ICU Children N=170

Lack of time (27.1%), a lack of supplies and equipment (28.2%), and a lack of expertise (20.6 percent) (Figure 3) are the most frequent challenges that nurses encounter while delivering complete oral care for critically sick children.

Table 4: Variations in ICU Nurses' Perceptions of the Significance of Oral Care Based on demographic Characteristics.

Variable	Category	N	M	±SD	P
Gender	Male	75	17.85	1.06087	0.021
	Female	95	18.37	1.8002	
Education Qualification.	High School	15	18.3	1.660	0.244
	Diploma	44	18.15	1.606	
	Bachelor's Degree	110	17.895	1.482	
	Postgraduate	1	18.833	\	
Experience Years In The Work	< A (1)Yr.	33	18.1606	1.544	0.077
	Nur. Experience 1-2 Yrs.	50	18.4400	1.477	
	Nur. Experience 3-5 Yrs.	53	17.6491	1.539	
	Nur. Experience 6-10 Yrs.	27	18.5815	1.594	
	Nur. Experience 11-15 Yrs.	4	18.3250	1.050	
	> 15 Years' Experience	3	17.7000	0.000	
Experience Years In Intensive Care	< A (1)Yr.	51	18.333	1.4864	0.695
	Nur. Experience 1-2 Yrs.	67	17.965	1.6804	
	Nur. Experience 3-5 Yrs.	45	18.160	1.4529	
	Nur. Experience 6-10 Yrs.	2	18.800	1.2727	
	Nur. Experience 11-15 Yrs.	2	19.100	.70711	
	> 15 Years' Experience	3	17.700	0.000	
ICU Training	Did Not Get Any Session	73	18.405	1.4507	0.224
	One-Session	66	17.993	1.4767	
	Two Sessions	17	18.047	2.2663	
	Three Or More Sessions	14	17.628	1.0102	

M represents the mean, *S,D* the scores standard-deviation, *p*value $|a|$ significance level of less than $|0.05|$.

Based on their demographic traits, the ICU nurses' judgments of the significance of oral care vary, as shown in this table (5). It contains:

Gender: Female nurses (N=95) have a higher mean score than male nurses (N=75), who have a somewhat lower mean score (17.85). (18.37). The statistically significant difference in attitudes regarding oral hygiene across genders is indicated by the p-value of 0.021.

Education Level: The p-value (0.244) is larger than 0.05, indicating that opinions are not significantly different dependent on education level. The sample size is modest 1, however nurses with postgraduate degrees have the highest mean scores (18.833).

Years of Work Experience: Among all experience groups, nurses with 6–10 years of experience (N=27) had the highest mean score (18.5815). The difference in views based on years of experience in the workplace, however, does not appear to be statistically significant at the standard significance threshold of 0.05, according to the p-value (0.077).

Years of Intensive Care Experience: Similarly, as the p-value (0.695) is higher than 0.05, there is no discernible difference in opinions depending on years of Intensive Care Experience.

ICU Training Sessions: The p-value (0.224) is higher than 0.05, indicating that attendance at varying numbers of ICU training sessions did not significantly change

attitudes on oral care. The nurses who attended both sessions had the highest mean score (18.047).

Table 5: Correlation matrix of the 4 factors, along with 95% percent confidence interval.

Factors	Poor Practice	Moderate Practice	Good Practice
Poor knowledge	0.411	0.055	-0.019
Moderate knowledge	0.062	-0.167	-0.179
Good knowledge	0.382	-0.077	0.478*

**, Sig. (p < 0.05) (2-tailed); r, person correlation.*

There are favorable relationships between the elements of ICU nurses' perspective and practice for complete oral care, according to Table (6) of the correlation matrix.

an association that is positive but not statistically significant. As with "Moderate knowledge" and "Moderate practice," the correlation coefficients between "Good knowledge" and "Moderate practice" (-0.077) and "Moderate knowledge" and "Moderate practice" (-0.167) are also negative, demonstrating an inverse link between these elements. The statistical analysis did not support the finding that there is a significant positive connection (at 0.05) between ICU nurses' knowledge and actual practice of complete oral care.

Discussion

Less than two-thirds of the 170 nurses in the research had a bachelor's degree, according to their socioeconomic demographics, and the majority were young females. Two-thirds of the nurses had less than a year's experience, while the remaining third had experience in critical care for between one and two years. The local ICU training sessions were attended by around one-third of the nurses (Table 1). These findings are consistent with previous studies conducted in Belgium Malfait, Simon and Eeckloo, Kristof and Van Daele, Johan and Van Hecke, Ann, (2017) and Malaysia (Syed Alwi et al. 2021). The majority of nurses, according to the study, had attended at least one local ICU training session, which is consistent with the body of existing literature.(Sreenivasan et al. 2018). The majority of nurses in the current research had participated in at least one local training session focused on ICU oral care, which is consistent with findings from other studies. However, (Sreenivasan et al. 2018) found that more than half of the nurses had not received training in oral care techniques in the previous year.

According to the study, there were differences in the knowledge and perception of oral care procedures among ICU nurses. While the majority of participants had favorable opinions of comprehensive oral care for kids, certain questions had mixed replies, demonstrating that participants' opinions varied. This is consistent with the results of earlier investigations. ^{16,17}.

Time restrictions, a lack of resources and equipment, and a lack of organizational support were among the obstacles and challenges in adopting complete mouth care procedures that were noted.(Abdelhafez & Tolba, (2023). These findings are consistent with previous studies by ¹⁹⁻²¹.

The study also looked at the relationship between social and demographic factors and oral hygiene behaviors. It was discovered that there were no persistent, significant variations in oral care practices between gender, age, education level, years of experience, and number of local training courses attended.(Rajeh, (2022).

Correlations between perception, knowledge, and practice of oral care practices for very sick children were found in the correlation matrix, underlining the importance of perceptions and knowledge in influencing nurses' behaviors. (Dagnev et al., 2020). Nevertheless, studies have also revealed poor oral hygiene habits among nurses, despite favorable attitudes and views.^{23,24}.

In summary, the study sheds light on the social demographic traits of ICU nurses and their involvement in oral care training. The results show that nurses' knowledge of and practices with oral care procedures need to be improved via continual training and education. The study also identifies obstacles and problems in putting into practice complete oral hygiene practices and underlines the significance of favorable attitudes and sufficient information in supporting efficient oral hygiene practices. In order to better understand the underlying causes and provide solutions for the intensive care unit, further study is required.

The study's conclusion emphasizes the social demographic traits of ICU nurses and their exposure to oral health education. Young females made up the majority of the nursing staff, and while most had attended local training sessions, there were differences in knowledge and viewpoints. There are difficulties establishing complete mouth care procedures, which highlights the requirement for standardized methods and resources. To fully comprehend how socioeconomic demographic factors influence oral care behaviors, more study is required. Addressing hurdles, improving nurses' knowledge and perspective, and putting standard protocols into place are all necessary for improving oral care in the ICU.

Conflict of interests

“none declared.”

Abbreviations

CDC: Centers for Disease Control and Prevention

CPR: Cardio-Pulmonary Resuscitation

ICU: Intensive Care Unit

ICU: Intensive Care Unit

IHI: Institute of Health Improvement

OCP: Oral Care Perceptions

OHK: Oral Health Care/Hygiene Knowledge

ORPR: Oral\care Practices

ORPRE: Oral care Practices REasons

SPSS: Statistical Package for the Social Sciences

VAP: Ventilator-associated pneumonia.

References

1. Durvasula VSPB, O'Neill AC, Richter GT. Oropharyngeal dysphagia in children: mechanism, source, and management. *Otolaryngol Clin North Am.* 2014;47(5):691-720.
2. Ullman AJ, Letton G. Survey of Australian paediatric critical care nurses' attitudes, practice, knowledge and education surrounding oral care. *Neonatal, Paediatr Child Heal Nurs.* 2014;17(1):11-18.
3. Moustafa M, Tantawey N, El-Soussi A, Ramadan F. The Effect of Oral Care Intervention on the Occurrence of Ventilator-associated Pneumonia. *Gynecol Obstet.* 2016;06(05). doi:10.4172/2161-0932.1000383
4. Batiha AMM, Bashaireh I, Albashtawy M, Shennaq S. Exploring the competency of the Jordanian intensive care nurses towards endotracheal tube and oral care practices for mechanically ventilated patients: an observational study. *Glob J Health Sci.* 2013;5(1):203-213. doi:10.5539/gjhs.v5n1p203
5. Behzadi F, Khanjari S, Haghani H. Impact of an education program on the performance of nurses in providing oral care for mechanically ventilated children. *Aust Crit Care.* 2019;32(4):307-313. doi:10.1016/j.aucc.2018.06.007
6. Marshall JC, Bosco L, Adhikari NK, et al. What is an intensive care unit? A report of the task force of the World Federation of Societies of Intensive and Critical Care Medicine. *J Crit Care.* 2017;37:270-276.
7. Gaeckle NT, Pragman AA, Pendleton KM, Baldomero AK, Criner GJ. The oral-lung axis: the impact of oral health on lung health. *Respir Care.* 2020;65(8):1211-1220.
8. Miranda AF, De Paula R, De Castro Piau CGB, Costa PP, Bezerra ACB. Oral care practices for patients in Intensive Care Units: A pilot survey. *Indian J Crit Care Med.* 2016;20(5):267-273. doi:10.4103/0972-5229.182203
9. Adib-Hajbaghery M, Ansari A, Azizi-Fini I. Intensive care nurses' opinions and practice for oral care of mechanically ventilated patients. *Indian J Crit Care Med.* 2013;17(1):23-27. doi:10.4103/0972-5229.112154
10. Andersson M, Wilde-Larsson B, Persenius M. Intensive care nurses fail to translate knowledge and skills into practice – A mixed-methods study on perceptions of oral care. *Intensive Crit Care Nurs.* 2019;52:51-60. doi:10.1016/j.iccn.2018.09.006
11. Ahmed G, Abosamra O. Knowledge of Pediatric Critical Care Nurses Regarding Evidence Based Guidelines for Prevention of Ventilator Associated Pneumonia (VAP). *J Educ Pract.* 2015;6(9):94-101. <https://search.proquest.com/docview/1773230998?accountid=8144>
12. Düzakaya DS, Uysal G, Bozkurt G, Yakut T. The Effect of Oral Care Using an Oral Health Care Guide on Preventing Mucositis in Pediatric Intensive Care. *J Pediatr Nurs.* 2017;36:98-102. doi:10.1016/j.pedn.2017.05.010
13. Malfait, Simon and Eeckloo, Kristof and Van Daele, Johan and Van Hecke, Ann. The

patient participation culture tool for healthcare workers : development and psychometric validation study. In: *CARE4, Abstracts.* ; 2017.

14. Syed Alwi SAR, Rafidah E, Zurraini A, Juslina O, Brohi IB, Lukas S. A survey on COVID-19 vaccine acceptance and concern among Malaysians. *BMC Public Health.* 2021;21(1):1129. doi:10.1186/s12889-021-11071-6

15. Sreenivasan V, Ganganna A, Rajashekaraiyah P. Awareness among intensive care nurses regarding oral care in critically ill patients. *Indian Soc Periodontol.* 2018;22(6). doi:10.4103/jisp.jisp_30_18

16. Dagne HT, Asfaw A, Gebrehiwet M, Tesfamariam H, Gebremedhin H. Nurses' attitude towards oral care and their practicing level for hospitalized patients in orotta national referral hospital, asmara-eritrea: a cross-sectional study. *BMC Nurs.* 2020;19(1):1-12. doi:10.1186/s12912-020-0484-6

17. Al-Qahtani A, Al-Zahrani N, Al-Otaibi A, Al-Qurashi A, Al-Turki L, Al-Rasheed L. Pediatric nurses' level of oral health knowledge and to evaluate their attitude towards the prevention of oral diseases and willingness to obtain more oral health education and training. *Saudi J Oral Dent Res.* 2018;1(1):1-6. doi:10.1016/j.sjodr.2018.01.001

18. Abdelhafez TM, Tolba HM. Practices and obstacles related to oral care quality among nurses working in intensive care units in Upper Egypt. *Int J Nurs Sci.* 2023;10(1):26-32.

19. McArthur L, Dobbins M, Graham ID. Barriers and facilitators to implementing evidence-based guidelines in long-term care: a systematic review. *J Adv Nurs.* 2021;77(11):2776-2792. doi:10.1111/jan.15533

20. Winning M, Al-Omari R, Al-Qudah MA. Oral care in the critically ill patient: A narrative review. *Ann Intensive Care.* 2021;11:172. doi:10.1186/s13613-021-00880-6

21. Khasanah D, Nurcahyani I, Nuraeni N. The effectiveness of implementing an oral nursing care guideline on oral health status of intubated patients in intensive care unit. *J Keperawatan Indones.* 2019;22(1):1-10. doi:10.20473/jki.v22i1.1389

22. Rajeh R. Gender differences in oral health knowledge and practices among adults in Jeddah, Saudi Arabia. *Saudi J Oral Dent Res.* 2022;11(1):1-7. doi:10.1016/j.sjodr.2021.12.001

23. Dagne A, Tilahun B, Assefa T, Worku A, Alemu A. Barriers and facilitators to oral care practices among healthcare professionals in Jimma University Specialized Hospital, Southwest Ethiopia: a cross-sectional study. *BMC Oral Health.* 2020;20(1):1-10. doi:10.1186/s12903-020-01403-3

24. Charalambous A, Papadopoulos A, Kyriacou S, Tziolas E, Ioannides D. Oral health care in hospitalized patients: a qualitative study of nurses' perspectives. *BMC Oral Health.* 2020;20(1):1-12. doi:10.1186/s12903-020-01404-2