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Original article

Assessment of Nurses' Knowledge, Attitude, and Practice on Oral Care for Intensive Care Unit Patients

Hend Miladi, Eman Gusbi*, Jamal Elcosbi

Faculty of Nursing, University of Tripoli, Tripoli, Libya
Corresponding email. e.gusbi@uot.edu.ly

Abstract
Maintaining oral hygiene for ICU patients is crucial for improving their overall health and avoiding complications. As the main providers of care, nurses need sufficient knowledge, positive attitudes, and proper practices to ensure effective oral care. This study aimed to assess nurses' understanding, perspectives, and methods regarding oral healthcare for ICU patients. The study sample was randomly selected from nurses at Tripoli Central Hospital, "Al-Zawiya Street" in Tripoli, and included 60 study participants, 28 of whom were males and 32 were females, with ages ranging from 18 to more than 50 years. And the sample was collected during the period June-July 2024. The data showed that the majority of participants were female (53%), and the highest age group was between 18-25 years (42%) and 25-35 years (42%). The highest age group of participants was less than 5 years (42%). 77% believed that they had sufficient experience in the field of nursing care, and 41% classified themselves as having obtained 9 out of 10. The results of the chi-square analysis on the questions related to knowledge, attitudes, and practice showed a statistical significance of 0.001 and positive answers, indicating that there is some awareness among nurses. The present study showed that nurses had positive attitudes, moderate knowledge, and reasonable practices regarding dental care. There is a need to include oral health training in nurses' education during their school years. Integration of oral health and public health should be a cornerstone of policy approaches for the prevention and control of oral diseases. A standard protocol should be developed in all health institutions.
Keywords: Oral Health, Practice, Intensive Care Units, Attitude, Knowledge, Nursing

Introduction

The primary goal of oral care is to promote oral hygiene and thereby decrease colonization of the oropharynx and dental plaque by bacteria and aspiration of colonized saliva. However, oral care is often neglected in critically ill patients or performed inadequately when a patient's mouth is swabbed only for comfort [1-5]. Despite numerous guidelines designed to prevent VAP, empirical evidence supporting the various aspects of the protocols is limited. For example, results of 2 studies suggest that toothbrushes are the tool of choice for effective oral care to decrease dental plaque reservoirs [6,7]. The ability of the toothbrush to remove plaque is consistently better and more clinically useful than foam swabs [8-10]. Grap et al [5] found that tooth-brushing was not routinely performed and that sponge toothettes were used more often than tooth brushes were used for patients receiving mechanical ventilation.

The health condition of the patient's upper airway in the intensive care unit is one of the health problems due to the health condition that the patient suffers from and the medical treatment provided. This is because intensive care patients have a weak immune system and are therefore susceptible to oral infections, such as candidiasis or herpes simplex [11]. Some medical conditions, for example, chronic anemia, diabetes, leukemia, and Crohn's disease, have oral manifestations. Oral intubation causes dry mouth and mucositis and helps with bacterial flora from predominantly Gram-positive to Gram-negative bacteria [12]. Patients on mechanical ventilation have an increased risk of oral shock due to the use of endotracheal tubes, tape, oral stents, and suction devices. An endotracheal tube can obscure the view of the oral cavity and limit access to oral care [13].

Medications can produce undesirable side effects, including dry mouth (xerostomia) caused by certain antihypertensives, sympathomimetics, and anticholinergics, while antibiotics may promote the growth of opportunistic pathogens like Candida albicans in the oral cavity [14]. Additionally, therapeutic dehydration, used to manage respiratory, renal, and cardiac function, can worsen xerostomia [15]. Poor oral hygiene in ICU patients increases infection risks, such as ventilator-associated pneumonia (VAP), a severe hospital-acquired infection linked to bacterial aspiration from the oropharynx or leakage of contaminated secretions around endotracheal tubes [16]. These bacteria often colonize the oral mucosa and dental plaque in intubated patients [17], making proper oral care a critical component of treatment.

ICU nurses, who come from varied educational and experiential backgrounds, are primarily responsible for patient care. Thus, assessing their knowledge, attitudes, and practices regarding oral hygiene in different ICU settings is essential. Research [18,19] indicates that eliminating oropharyngeal bacteria requires dental plaque removal, which is most effectively achieved with a toothbrush. However, studies like Pearson and Hutton's [20] reveal that many nurses prefer using soft Toothettes, which are less effective than toothbrushes in plaque removal, allowing harmful bacteria to persist [12]. This study aimed to examine nurses' knowledge, attitudes, and practices concerning oral care for ICU patients.

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Methods

Study design

The current study used the comparative descriptive approach. A total of 60 nurses worked at Tripoli Central Hospital during the period June - July 2024.

Data collection

Data collection was carried out over a one-month period using a structured questionnaire administered to nurses. The instrument comprised three main sections—Knowledge, Attitude, and Practice—containing a total of 10 items, in addition to a demographic section with 5 questions. The knowledge domain was evaluated through four items, while the attitude domain included two items rated on a five-point Likert scale (Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree). The practice domain consisted of four items: the first two were assessed using the same five-point Likert scale, the third offered frequency options (Once a day, twice a day, three times a day), and the final item provided categorical responses (Yes, No, Not Sure).

Statistical analysis

Data were entered into Microsoft Excel spreadsheets, and IBM SPSS version 26.0 was used for statistical analysis. The chi-square test was used for significant difference, and $P<0.05$ was considered significant.

Results

Demographic data

Data from 60 nurses showed that the majority of participants were female (53%), with the highest age group being between 18-25 years (42%) and 25-35 years (42%). The highest age group for participants was less than 5 years (42%), followed by 6-10 years (41%). It is believed that 77% have sufficient experience in the field of nursing care, and 41% rate themselves as having 9 out of 10 degrees.

Table 1. Distribution of demographic data of study participants' responses.

Variables	Male	Female	Total
Gender	28 (47%)	32 (53%)	60 (100%)
Age	14 (50%)	11 (34%)	25 (42%)
18 – 25 years			
25 – 35 years	10 (36%)	15 (47%)	25 (42%)
35 – 50 years	4 (14%)	4 (13%)	8 (13%)
Over 50 years	0 (0%)	2 (6%)	2 (3%)
Total	28 (100%)	32 (100%)	60 (100%)
How many years of experience do you have?	17 (63%)	8 (25%)	25 (42%)
Less than 5 years			
6 – 10 years	7 (26%)	17 (53%)	24 (41%)
More than 10 years	3 (11%)	7 (22%)	10 (17%)
Total	27 (100%)	32 (100%)	59 (100%)
Do you have sufficient practical experience in the field of nursing care?	18 (64%)	28 (88%)	46 (77%)
Yes			
No	6 (21%)	2 (6%)	8 (13%)
Not sure	4 (15%)	2 (6%)	6 (10%)
Total	28 (100%)	32 (100%)	60 (100%)
How would you rate your work experience in the intensive care unit out of 10?	11 (50%)	4 (17%)	15 (33%)
7 Degrees			
8 Degrees	2 (9%)	6 (25%)	8 (17%)
9 Degrees	9 (41%)	10 (41%)	19 (41%)
10 Degrees	0 (0%)	4 (17%)	4 (9%)
Total	22 (100%)	24 (100%)	46 (100%)

Assessment of knowledge among nurses on oral care for intensive care unit patients

The results of the Chi-square analysis of knowledge regarding the answers to the first, third and fourth questions showed that the highest average answers were strongly agree and showed a statistical significance of 0.001, while the answer to the second question showed the highest average answers were strongly disagree and showed a statistical significance of 0.002 (Table 2).

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Table 2. Assessment of Knowledge Among Nurses on Oral Care for Intensive Care Unit Patients

Variables	Male	Female	Total	Chi square
Can ICU patients develop oral complications due to their medications?	0 (0%)	3 (9%)	3 (5%)	0.001
Strongly Disagree	1 (4%)	0 (0%)	1 (2%)	
Disagree	1 (4%)	1 (3%)	2 (3%)	
Neutral	4 (14%)	5 (16%)	9 (15%)	
Agree	22 (78%)	23 (72%)	45 (75%)	
Strongly Agree Total	28 (100%)	32 (100%)	60 (100%)	
Have you ever felt that cleaning the oral cavity of ICU patients is a very unpleasant task?	11 (39%)	18 (56%)	29 (48%)	0.002
Strongly Disagree	9 (33%)	6 (19%)	15 (25%)	
Disagree	2 (7%)	2 (6%)	4 (7%)	
Neutral	2 (7%)	4 (13%)	6 (10%)	
Agree	4 (14%)	2 (6%)	6 (10%)	
Strongly Agree Total	28 (100%)	32 (100%)	60 (100%)	
Do you feel that the nurse is responsible for providing oral care in your unit?	0 (0%)	3 (9%)	3 (5%)	0.001
Strongly Disagree	0 (0%)	0 (0%)	0 (0%)	
Disagree	4 (14%)	5 (16%)	9 (15%)	
Neutral	19 (68%)	18 (56%)	37 (62%)	
Agree	5 (18%)	6 (19%)	11 (18%)	
Strongly Agree Total	28 (100%)	32 (100%)	60 (100%)	
Do you think that every patient admitted to the ICU should be reviewed by a dentist to assess oral care needs and provide a management plan?	0 (0%)	0 (0%)	0 (0%)	0.001
Strongly Disagree	0 (0%)	0 (0%)	0 (0%)	
Disagree	3 (11%)	6 (19%)	9 (15%)	
Neutral	7 (25%)	10 (31%)	17 (28%)	
Agree	18 (64%)	16 (50%)	34 (57%)	
Strongly Agree	28 (100%)	32 (100%)	60 (100%)	
Total				

Assessment of attitude among nurses on oral care for intensive care unit patients

The results of the chi-square analysis of the attitudes regarding the answers to the first question showed that the highest average of the answers was strongly agree and showed a statistical significance of 0.002, while the answer to the second question showed that the highest average of the answers was strongly agree and showed a statistical significance of 0.001 (Table 3).

Table 3. Assessment of Attitude Among Nurses on Oral Care for Intensive Care Unit Patients

Variables	Male	Female	Total	chi square
Does improper or inadequate oral care in ICU patients cause systemic complications?	1 (4%)	0 (0%)	1 (2%)	0.002
Strongly Disagree	1 (4%)	1 (3%)	2 (3%)	
Disagree	2 (7%)	6 (19%)	8 (13%)	
Neutral	7 (25%)	6 (19%)	13 (22%)	
Agree	17 (60%)	19 (59%)	36 (60%)	
Strongly Agree	28 (100%)	32 (100%)	60 (100%)	
Total				

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Does poor oral hygiene cause ventilator-associated pneumonia (VAP) in ICU patients on ventilators?	0 (0%)	0 (0%)	0 (0%)	
Strongly Disagree				
Disagree	0 (0%)	3 (9%)	3 (5%)	0.001
Neutral	1 (4%)	1 (4%)	2 (3%)	
Agree	3 (11%)	3 (9%)	6 (10%)	
Strongly Agree	24 (85%)	25 (78%)	46 (82%)	
Total	28 (100%)	32 (100%)	60 (100%)	

Assessment of practice among nurses on oral care for intensive care unit patients

The results of the chi-square analysis of knowledge regarding the answers to the first question showed that the highest average of answers was strongly agree and showed a statistical significance of 0.001, while the answer to the second question showed that the highest average of answers was strongly disagree and showed a statistical significance of 0.004. As for the third question, it showed providing oral health care 3 times a day and was statistically significant at 0.001. As for the fourth question, regarding the official protocol for assessing the oral cavity, the average answer was "No" and showed a statistical significance of 0.001 (Table 2).

Table 4. Assessment of Practice Among Nurses on Oral Care for Intensive Care Unit Patients

Variables	Male	Female	Total	Chi square
Do you find it difficult to clean the oral cavity of ICU patients?	7 (25%)	11 (34%)	18 (30%)	
Strongly Disagree				
Disagree	11 (39%)	10 (31%)	21 (35%)	0.001
Neutral	6 (22%)	6 (19%)	12 (20%)	
Agree	2 (7%)	4 (13%)	6 (10%)	
Strongly Agree	2 (7%)	1 (3%)	3 (5%)	
Total	28 (100%)	32 (100%)	60 (100%)	
Do you feel that most patients who are on mechanical ventilation get worse regardless of the type of oral care you provide?	1 (4%)	0 (0%)	1 (2%)	
Strongly Disagree				
Disagree	0 (0%)	0 (0%)	0 (0%)	0.004
Neutral	3 (11%)	1 (3%)	4 (7%)	
Agree	5 (18%)	6 (19%)	11 (18%)	
Strongly Agree	19 (67%)	25 (78%)	44 (73%)	
Total	28 (100%)	32 (100%)	60 (100%)	
How often do you provide oral care to ICU patients in your unit?	0 (0%)	1 (3%)	1 (2%)	
Once a day				
Twice a day	8 (30%)	8 (25%)	16 (27%)	0.001
Three times a day	19 (70%)	23 (72%)	42 (71%)	
Total	27 (100%)	32 (100%)	59 (100%)	
In your current ICU, is there a formal protocol for assessing patients' oral cavity/1oral health needs?	3 (11%)	4 (13%)	7 (12%)	
Yes				
No	23 (82%)	26 (81%)	49 (81%)	0.003
Not sure	2 (7%)	2 (6%)	4 (7%)	
Total	28 (100%)	32 (100%)	60 (100%)	

Discussion

The present study showed that there is no standard protocol for oral care for patients admitted to the intensive care unit (ICU) (81%), which makes analyzing the knowledge, attitude, and practices among nurses towards oral care among these patients more important. This helps in noticing and reporting differences and emphasizing the development of policy and protocol to standardize the quality of oral care provision for these patients. The present study showed that 47% were males and 53 females, the highest age group was (18-25 years) and (25-35 years) with equal percentages (47%). While the study of Gaffar et al. showed that

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male participants in the study (80%) were higher than females (20%), and the highest age group was between 30-36 years, with a percentage of 36.8% [21].

The present study showed that (77%) of nurses received good training in intensive care, which was supported by a study conducted in Riyadh [22], where only about (66%) of nurses reported receiving some form of training in assessing and providing oral care to patients associated with the intensive care unit. While our study found that high percentages of nurses have adequate knowledge about oral complications that may develop due to medications and exposure to ventilator-associated pneumonia (VAP) among these patients, contradictory studies were found. Studies conducted by Khojastehfar et al. [23] and Chan et al. [24] reported low to moderate levels of knowledge in their group of nurses surveyed. While this was in agreement with a study conducted by Philip et al. [25].

In general, nurses responded positively to attitude questions; most studies reported the same regarding nurses' attitude toward oral care of ICU patients [25-27]. Although nurses had a strong positive attitude toward oral care, some studies found significant disagreement among nurses regarding oral care being an unpleasant and difficult task to perform [28,29].

Conclusion

The present study showed that nurses had positive attitudes, moderate knowledge, and reasonable practices regarding dental care. There is a need to include oral health training in nurses' education during their school years. Integration of oral health and public health should be a cornerstone of policy approaches for the prevention and control of oral diseases. A standard protocol should be developed in all health institutions. We recommend that a proposal be made to develop appropriate educational planning to raise the level of knowledge, attitude, and practice of health care providers, especially nurses, in the field of oral and dental care within the intensive care unit. We also recommend that comprehensive studies be conducted in all health institutions to reveal the knowledge, attitudes, and practices of patients in the intensive care unit regarding the care of patients' oral health. Establish basic protocols and rules to be followed by all nurses in the intensive care unit regarding the care of patients' oral health.

Conflict of interest

Authors declare no conflict of interest.

References

1. Centers for Disease Control and Prevention. Guidelines for preventing healthcare-associated pneumonia. MMWR Recomm Rep. 2004;53(RR-3):1-36.
2. Cutler C, Davis N. Improving oral care in patients receiving mechanical ventilation. Am J Crit Care. 2005;14(5):389-94.
3. Binkley C, Furr A, Carrico R, McCurren C. Survey of oral care practices in US intensive care units. Am J Infect Control. 2004;32(3):161-9.
4. Sole M, Byers J, Ludy J, Zhang Y, Banta C, Brummel K. A multisite survey of suctioning techniques and airway management practices. Am J Crit Care. 2003;12(3):220-32.
5. Grap M, Munro C, Ashtiani B, Bryant S. Oral care interventions in critical care: frequency and documentation. Am J Crit Care. 2003;12(2):113-9.
6. Pearson L. A comparison of the ability of foam swabs and toothbrushes to remove dental plaque: implications for nursing practice. J Adv Nurs. 1996;23(1):62-9.
7. Nelsey L. Mouthcare and the intubated patient: the aim of preventing infection. Intensive Care Nurs. 1986;2(4):187-93.
8. Munro C, Grap M. Oral health and care in the intensive care unit: state of the science. Am J Crit Care. 2004;13(1):25-33.
9. Pearson L, Hutton J. A controlled trial to compare the ability of foam swabs and toothbrushes to remove dental plaque. J Adv Nurs. 2002;39(5):480-9.
10. Fitch FA, Munro CL, Glass CA, Pellegrini JM. Oral care in the adult intensive care unit. Am J Crit Care. 1999;8(5):314-8.
11. Moretti AJ, Flaitz DM, Peninger M, et al. Evaluation of oral soft tissue lesions in ventilated patients. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2002;93(4):427.
12. Dennesen P, van der Ven A, Vlasveld M, et al. Inadequate salivary flow and poor oral mucosal status in intubated intensive care unit patients. Crit Care Med. 2003;31(3):781-6.
13. McNeill H. Biting back at poor oral hygiene. Intensive Crit Care Nurs. 2000;16(6):367-72.
14. Holberton P, Liggett G, Lundberg D. Researching mouthcare in the ICU. Can Nurse. 1996;92(5):51-2.
15. Kite K. Changing mouth care practice in intensive care: implications of the clinical setting context. Intensive Crit Care Nurs. 1995;11(4):203-9.
16. Grap MJ, Munro CL. Ventilator-associated pneumonia: clinical significance and implications for nursing. Heart Lung. 1997;26(6):419-29.
17. Scannapieco FA, Stewart EM, Mylotte JM. Colonization of dental plaque by respiratory pathogens in medical intensive care patients. Crit Care Med. 1992;20(6):740-5.
18. El-Solh A, Pietrantoni C, Bhat A, et al. Colonization of dental plaques: A reservoir of respiratory pathogens for hospital-acquired pneumonia in institutionalized elders. Chest. 2004;126(5):1575-82.

Received*: 16-11-2025 -* ***Accepted****: 15-01-2026 -* ***Published****: 21-01-2026*

19. Shinn J. Keeping pace: Decreasing the risk of ventilator-associated pneumonia: The impact of nursing care. Prog Cardiovasc Nurs. 2004;19(3):123-4.
20. Pearson L, Hutton J. A controlled trial to compare the ability of foam swabs and toothbrushes to remove dental plaque. J Adv Nurs. 2002;39(5):480-9.
21. Gaffar B, Bakhurji E, AlKhateeb R, AlHashim H, AlGaoud H, AlDaamah Z, Virtanen JI. Exploring factors influencing nurses' attitudes towards their role in dental care. PLoS One. 2023;18(7):e0288927.
22. Iyer K, AlKhalifah K, Alshahrani BN, Alghamdi SSI, Albishi S, Alsheraihi AA, Al Sudairy N. Assessment of Knowledge, Attitude, and Practice (KAP) Among Nurses on Oral Care for Intensive Care Unit Patients in Riyadh, Saudi Arabia: A Cross-Sectional Study. Cureus. 2023;15(12):e50682.
23. Khojastehfar S, Ghezeljeh TN, Haghani S. Factors related to knowledge, attitude, and practice of nurses in intensive care unit in the area of pressure ulcer prevention: A multicenter study. J Tissue Viability. 2020;29(2):76-81.
24. Chan EY, Ng IHL. Oral care practices among critical care nurses in Singapore: a questionnaire survey. Appl Nurs Res. 2012;25(3):197-204.
25. Philip P, Villarosa A, Gopinath A, Elizabeth C, Norman G, George A. Oral health knowledge, attitude and practices among nurses in a tertiary care hospital in Bangalore, India: a cross-sectional survey. Contemp Nurse. 2019;55(2-3):261-74.
26. Alja'afreh MA, Mosleh SM, Habashneh SS. Nurses' perception and attitudes towards oral care practices for mechanically ventilated patients. Saudi Med J. 2018;39(4):379-85.
27. Saddki N, Mohamad Sani FE, Tin-Oo MM. Oral care for intubated patients: a survey of intensive care unit nurses. Nurs Crit Care. 2017;22(2):89-98.
28. Kim Y, Ku HM, Jun MK. Knowledge evaluation of oral diseases and perception of cooperation with dental experts for oral care of nurses in intensive care units in Korea: a preliminary study. Nurs Rep. 2023;13(1):528-38.
29. Narbutaitė J, Skirbutytė G, Virtanen JI. Oral care in intensive care units: Lithuanian nurses' attitudes and practices. Acta Odontol Scand. 2023;81(5):408-13.

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