



Brief report

Factors influencing intensive care nurses' knowledge and attitudes regarding ventilator-associated pneumonia and oral care practice in intubated patients in Croatia



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Adequate oral care in intubated patients may reduce occurrence of ventilator-associated pneumonia. The purpose of this study was to explore knowledge, attitudes, and oral care practice in Croatian intensive care units and influencing factors. Nurses' knowledge is insufficient; however, most of them reported positive attitude toward the importance of oral care. Performed oral hygiene measures are mostly inappropriate. There is a need to improve the knowledge of ventilator-associated pneumonia and oral care.

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Ventilator-associated pneumonia (VAP) is a common health care-acquired infection with incidence of up to 28% in patients on mechanical ventilation in intensive care units (ICUs) and up to 30% in Croatia. It is associated with increased mortality.^{1,2}

Oral care interventions may contain respiratory pathogens, therefore reducing the risk of VAP.³

The actions focusing on prevention and control of VAP are dependent on education, attitudes, and knowledge of nurses on VAP issues.

Studies showed a lack of knowledge on VAP prevention^{4,5} but also a notable interest of nurses to learn more.^{6,7} Oral care measures and frequencies of practice varied between hospitals.^{5,6,8}

Despite the importance of adequate oral care in preventing VAP, there are still various factors inhibiting ICU nurses from performing oral care.⁸ Because there are no data available on oral care practice, protocols, and specific barriers to oral care in Croatian ICUs, the purpose of this study was to explore those issues and influencing factors.

METHODS

A cross-sectional questionnaire survey included a convenient sample of ICU nursing staff members of 14 public hospitals (6 large) in all parts of Croatia. A local ethics committee approved the survey.

The data were collected using a questionnaire designed by the researchers. The questionnaire, based on prior studies,⁷⁻⁹ included demographic information, work experience, knowledge, attitudes, and practice. Praxis score was calculated as the sum of 3 elements: practice of oral care, a person who performs oral care for ICU patients, and frequency of oral care. A Praxis score of 0 refers to low oral care performance, and a score of 3 refers to high oral care performance. The knowledge score of the etiology, incidence, and prevention of VAP presented the total number of correct responses on 10 true or false statements. To assess respondents' attitudes regarding oral care for ICU patients, a 10-item instrument with a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used.

Factor analysis, Spearman correlation, Kruskal-Wallis test, and Mann-Whitney *U* test were used in the statistical analysis.

RESULTS

The total of 241 ICU nursing staff participated (response rate, 62.9%). The group was 86.8% women, with a median age of 33 years

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Table 1
Attitudes regarding oral care in ICU patients grouped in dimensions by explanatory factor analysis: Principal components with varimax rotation

Attitudes	Mean (SD)	Median (interquartile range)
Factor 1: Education and adequate oral care practice for ICU patients	15.9 (2.6)	16 (14-18)
7. In our unit oral care is performed properly.	4.1 (0.8)	4 (4-5)
8. Hospital provides us with enough material to perform adequate oral care.	3.4 (1.2)	4 (2-4)
9. I am sufficiently educated about the importance of oral care in ICU patients.	4.3 (0.8)	4 (4-5)
10. I am sufficiently educated about oral care methods in ICU patients.	4.2 (0.8)	4 (4-5)
Factor 2: Positive attitudes regarding the importance of oral care in ICUs	13.8 (1.5)	14 (13-15)
1. Oral care is an important part of caring for patients in ICUs.	4.7 (0.6)	5 (4-5)
2. Providing adequate oral care may prevent complications in ICU patients.	4.3 (0.7)	4 (4-5)
5. Patient's oral care is one of daily tasks of ICU nursing staff.	4.8 (0.5)	5 (5-5)
Factor 3: Negative attitudes regarding the importance of oral care in ICUs	7.9 (2.4)	8 (6-9)
3. Oral care does not significantly affect the outcome of treatment of ICU patients.	2.7 (1.3)	3 (2-4)
4. Other forms of care activities are more important for patient welfare than oral care.	3.3 (1.1)	3 (3-4)
6. Oral care tasks in ICU patients should be performed by specialized staff, not nurses.	1.9 (1.1)	2 (1-2)

ICU, intensive care unit.

(interquartile range, 27-43). Most had secondary education (76.8%), with mean years of nursing and ICU experience of 14.6 ± 9.8 and 11.3 ± 8.8 , respectively.

Education concerning VAP was received by most of the respondents during their nursing practice (87.1%). The overall knowledge score was 65.7%.

Respondents' attitudes regarding oral care in ICU patients and their grouping into 3 factors and dimensions are shown in Table 1. The factors explain 23.1%, 21.2%, and 14.6% of the variability, respectively. The items of the questionnaire showed moderate internal consistency reliability (Cronbach $\alpha = 0.46-0.70$), and the average correlation for the items is between 0.22 and 0.46. Reliability is the highest in factor 1 and the lowest in factor 3.

Most nurses provided oral care for patients 2-3 times a day (65%). Gauze soaked with paraffin oil and rinsing the oral cavity with chlorhexidine were the most frequently performed (74.7% and 58.1%, respectively).

Lack of time (58.1%), staff (48.5%), and supplies and equipment (44.4%) were the main barriers to provision of oral care.

Only a few significant, but weak, correlations were present between demographic variables, knowledge, attitudes, and oral care practice (Table 2).

DISCUSSION

Present results indicate a nurses' lack of knowledge of VAP and oral care in Croatia; however, other authors report even less knowledge from the nurses.^{4,5} Insufficient knowledge may be the result of deficient information because oral health and hygiene has been an area overlooked in overall nursing education.¹⁰ Oral care is not only basic patient care, but it is also an infection control activity.¹¹

More than a half of the respondents in our study declared that there is a standardized written oral care protocol in the ICU

Table 2
Spearman correlations between sociodemographic predictors, sources of knowledge and working conditions, and knowledge, attitudes, and Praxis score regarding VAP and oral care in intubated patients

	Knowledge score	Attitude F1	Attitude F2	Attitude F3	Praxis score
Knowledge score	1				
<i>r</i>	1				
<i>P</i>	—				
Attitude F1		1			
<i>r</i>	-0.090	1			
<i>P</i>	0.178	—			
Attitude F2			1		
<i>r</i>	0.061	0.178	1		
<i>P</i>	0.362	0.007	—		
Attitude F3				1	
<i>r</i>	-0.149	0.059	-0.340	1	
<i>P</i>	0.025	0.365	<0.001	—	
Praxis score					1
<i>r</i>	0.042	0.198	0.233	0.125	1
<i>P</i>	0.528	0.002	<0.001	0.057	—
Age (years)					
<i>r</i>	-0.040	0.081	-0.165	0.119	-0.139
<i>P</i>	0.546	0.216	0.012	0.068	0.034
Education (years)					
<i>r</i>	0.085	-0.114	0.106	-0.047	-0.056
<i>P</i>	0.200	0.080	0.105	0.472	0.394
Total work experience (years)					
<i>r</i>	-0.012	0.089	-0.162	0.138	-0.112
<i>P</i>	0.859	0.173	0.014	0.035	0.089
Work in an ICU (years)					
<i>r</i>	0.014	0.033	-0.117	0.125	-0.105
<i>P</i>	0.835	0.619	0.076	0.057	0.114
Sex (1 = male, 2 = female)					
<i>r</i>	-0.046	-0.031	-0.036	-0.100	0.047
<i>P</i>	0.502	0.643	0.591	0.137	0.487
Presence of a written protocol (0 = no, 1 = yes)					
<i>r</i>	-0.171	0.073	0.199	0.114	0.300
<i>P</i>	0.010	0.265	0.002	0.08	<0.001
Nursing school as a source of VAP knowledge (0 = no, 1 = yes)					
<i>r</i>	-0.096	-0.082	0.100	-0.002	0.135
<i>P</i>	0.146	0.209	0.126	0.976	0.039
Working place as a source of VAP knowledge (0 = no, 1 = yes)					
<i>r</i>	0.079	0.151	0.029	0.012	0.103
<i>P</i>	0.233	0.020	0.663	0.854	0.116
Courses as a source of VAP knowledge (0 = no, 1 = yes)					
<i>r</i>	0.058	0.035	0.037	0.144	0.160
<i>P</i>	0.379	0.591	0.578	0.026	0.014
Other sources (0 = no, 1 = yes)					
<i>r</i>	-0.041	-0.001	-0.035	-0.016	-0.034
<i>P</i>	0.540	0.983	0.598	0.801	0.604
Additional education score					
<i>r</i>	0.110	-0.254	0.084	-0.139	-0.052
<i>P</i>	0.097	<0.001	0.201	0.033	0.430
Factor lack of time (0 = no, 1 = yes)					
<i>r</i>	-0.139	0.106	-0.117	0.089	0.135
<i>P</i>	0.036	0.102	0.075	0.171	0.039
Factor lack of education (0 = no, 1 = yes)					
<i>r</i>	0.118	-0.121	-0.125	0.036	-0.51
<i>P</i>	0.074	0.061	0.057	0.583	0.435
Factor staff (0 = no, 1 = yes)					
<i>r</i>	0.044	0.087	-0.014	0.138	0.046
<i>P</i>	0.508	0.180	0.828	0.034	0.483
Factor material (0 = no, 1 = yes)					
<i>r</i>	0.121	-0.383	0.127	-0.124	0.034
<i>P</i>	0.068	<0.001	0.052	0.056	0.607
Factor other (0 = no, 1 = yes)					
<i>r</i>	0.023	0.119	0.015	-0.045	-0.053
<i>P</i>	0.733	0.067	0.815	0.493	0.416

ICU, intensive care unit; VAP, ventilator-associated pneumonia.

where they work, similar to Scotland.¹¹ Oral care protocols play an important role in informing nurses, especially because most of the nurses in our study stated that the working place and senior nurses are their main sources of information. According to our study, the

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