

Knowledge and attitudes of Saudi intensive care unit nurses regarding oral care delivery to mechanically ventilated patients with the effect of healthcare quality accreditation

ABSTRACT

Introduction: Ventilator-associated pneumonia is a major morbid outcome among intensive care unit (ICU) patients. Providing oral care for intubated patients is an important task by the ICU nursing staff in reducing the mortality and morbidity. The objectives of this study were to evaluate the attitudes and knowledge of ICU nurses regarding oral care delivery to critically ill patients in Saudi Arabian ICUs. The findings were further correlated to the presence of healthcare quality accreditation of the institution.

Materials and Methods: The nurses' knowledge, attitudes, and healthcare quality accreditation status of the hospital were recorded. Two hundred fifteen nurses conveniently selected from 10 random hospitals were included in this study from Riyadh city, Saudi Arabia. This is a cross-sectional study in the form of a questionnaire.

Results: When comparing the knowledge of the participants to their level of education, there was no statistically significant difference between the two groups of nurses. The majority of the nurses agreed that the oral cavity is difficult to clean and that oral care delivery is a high priority for mechanically ventilated patients. Furthermore, there was no statistically significant difference in the attitudes between nurses working in accredited and nonaccredited hospitals.

Conclusion: The presence of healthcare quality accreditation did not reflect any significance in attitudes or knowledge of the ICU nurses in regard to mechanically ventilated patients. Factors affecting oral care delivery should be evaluated on the personal and institutional level to achieve better understanding of them.

Key words: Healthcare quality; intensive care; mechanical ventilation; nursing; oral care hygiene; quality accreditation

Introduction

Hospital-acquired pneumonia (HAP) is one of the most common complications encountered among intensive care unit (ICU) patients.^[1] A subdivision of HAP is ventilator-associated pneumonia (VAP) which is defined by the American

Thoracic Society as pneumonia occurring in mechanically ventilated patients after a period not <48 h.^[2] VAP has been reported as the second most common nosocomial infection in the United States of America, and it is the most common

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nosocomial infection in mechanically ventilated patients.^[3] VAP is considered as a major morbid outcome among critically ill patients.^[4] It has been observed that the oral flora of intubated patients undergoes a change to predominantly Gram-negative flora comprising highly virulent organisms which can cause VAP.^[5,6] Oral care for intubated patients is an integral task provided by the ICU nursing staff. Moreover, intubated patients rely completely on the nursing staff for their oral care needs, thereby increasing the influence and the importance of nursing staff in reducing VAP.^[7,8]

Several studies have acknowledged the impact of evaluating the factors influencing oral care delivery to critically ill patients by nursing staff. Factors which were evaluated included the knowledge and attitude of nurses regarding oral care for patients, and also the availability of hospital supplies.^[7,9,10] The mechanisms of transmission causing VAP were evaluated by Binkley *et al.* and Perrie *et al.* using scenario based assessments of ICU nurses. Employing a 10-point scale, with 10 implying the most likely cause, they found that VAP was predominantly caused by “aspiration of contaminated secretions from the oropharynx” with mean scores of 7.46 and 7.01, respectively.^[11,12] Based on a study conducted in 59 European ICUs, Rello *et al.* reported that 88.1% of ICU nurses accorded a high priority for oral care among intubated patients.^[13] Interestingly, Soh *et al.* reported that, 61.3% of Malaysian ICU nurses found the oral cavity of the mechanically ventilated patients to get worse no matter how they clean it, and a majority of them (84.7%) reported the need for better oral care equipment in ICUs.^[14]

It has been reported that VAP among ICU patients resulted in a significant increase in the mean duration of ICU stay and the cost and duration of hospitalization.^[15] This implies that the economic impact of VAP on patients and their families. While several studies^[11,12,14] have emphasized the importance of oral care protocols to reduce the incidence of VAP among mechanically ventilated patients, there are not many studies evaluating the implementations of such protocols. In recent times, healthcare quality accreditation by internationally renowned agencies has aimed at standardizing health care practices and their delivery in accredited hospitals. The Joint Commission International (JCI) and the Accreditation Canada International (ACI) are healthcare accrediting organizations recognized by the International Society for Quality in Health Care.^[16] According to their websites, the JCI and the ACI, respectively, have around 600 and 65 accredited organizations worldwide^[17,18] including a few hospitals in Saudi Arabia.

Although it is evident that the attitude and knowledge of ICU nurses and the availability of oral care supplies

affect the quality of oral care delivered to critically ill ICU patients, there have been no studies conducted in Saudi Arabia to evaluate the same. Moreover, the impact of healthcare quality accreditation on the quality of oral care delivered by ICU nurses has seldom been reported so far. Therefore, the aim of the present study was to evaluate the attitudes and knowledge of ICU nurses regarding oral care delivery to critically ill patients and their perception regarding the availability of oral care supplies in Saudi Arabian ICUs. The above findings were further correlated to the presence of healthcare quality accreditation of the institution.

Materials and Methods

Design and sample

A cross-sectional study design in the form of a questionnaire was distributed to ICU nurses providing care to mechanically ventilated patients in 10 randomly selected hospitals in Riyadh, Saudi Arabia. The study sample and questionnaire used by the authors in a previous study were used in the present study too.^[19]

The questionnaire (survey tool)

The questionnaire used in this study was a modified version of the instrument developed by Binkley *et al.* based on a review of protocols and guidelines existing at that time.^[11] After due permission from the authors, the questionnaire was modified and updated based on the latest evidence-based guidelines proposed by Berry *et al.*^[20] In addition, demographic information, such as age, years of experience, level of education of the nurses, and the ICU setting where they worked most, were collected.

The knowledge of the nurses was assessed by giving them a case scenario: “An 18-year-old male, who was involved in a vehicle accident 5 days ago, was admitted to the ICU. He has been mechanically ventilated since admission and has now developed pneumonia.” Based on five statements reflecting the possible mechanisms of transmission, the participants were asked to evaluate the likelihood of the mechanism of transmission using an analog scale ranging from 1 to 10. Wherein, a score of 1 meant least likely and 10 meant most likely [Table 1]. The attitudes part of the questionnaire had five statements, four of which were based on the questionnaire designed by Binkley *et al.* and the fifth was added by the authors [Table 2].

Regarding oral care supplies provided by the hospital, participants were assessed using a five-point Likert scale based on four statements derived from Binkley *et al.* questionnaire [Table 3]. Questions pertaining to

the accreditation status of the hospital by international accreditation agencies (JCI/ACI) were included to gather information about the same. The questionnaire was reviewed by an ICU specialist and tested after modification for clarity and accuracy on 12 nurses.

Ethical considerations

Ethical approval for the study was obtained from the Ethical Committee at College of Dentistry Research Center #IR 0033, King Saud University, Riyadh, Saudi Arabia. A written informed consent including anonymity and privacy terms was obtained from the participants. Confidentiality of the participants was upheld to the maximum extent permissible under law.

Data management and analysis

The sample size was estimated using StatCalc (Epi Info 7.1.3.3, CDC, Atlanta, GA, USA). Based on 50% expected frequency, type I error (alpha) of 0.05, and 95% confidence interval the sample size was arrived at 210. All the data

were analyzed using Statistical Package for Social Sciences software program (version 20.0.0, IBM Statistics, Chicago, IL, USA). Descriptive statistics were used to summarize the data. Knowledge and attitudes regarding oral care delivery by the ICU nurses were compared to the educational level of the nurses and the healthcare quality accreditation status of the institutions using independent *t*-test with significance level set at $P < 0.05$. All the data were double-checked for accuracy.

Results

A total of 225 questionnaires were distributed randomly to the nurses in 10 hospitals by two of the authors and 215 were returned exceeding the required sample size by five. The mean age of the nurses was 33.06 years (standard deviation [SD] 7.19; range: 23-55 years) and their mean years of experience in the ICU was 7.49 (SD 5.58; range: 1-26). While, more than half of the nurses possessed a bachelor's degree or higher in nursing (67.5%, $n = 140$), the remaining participants possessed only nursing diplomas. Majority of the nurses were associated with a medical/multidisciplinary type ICU and worked predominantly during day shifts [Table 4].^[19]

Intensive care unit nurses' knowledge

Based on the case scenario mentioned before, "aspiration of contaminated secretions from the oropharynx" was

Table 1: ICU nurses' response to the clinical case scenario

Mechanism of transmission	Mean*	SD*
"Transmission from other patients"	4.06	2.56
"Aspiration of contaminated secretions from the oropharynx"	7.07	2.46
"Transmission from health care workers' hands"	5.28	2.79
"Transmission from contaminated respiratory equipment"	6.76	2.67
"Preadmission colonization"	5.05	2.63

*On a scale of 1-10, where 1 is least likely and 10 is most likely. ICU: Intensive care unit; SD: Standard deviation

Table 2: Attitudes of the ICU nurses based on the statements

Questionnaire statements	Strongly agree <i>n</i> (%)*	Somewhat agree <i>n</i> (%)*	Neither agree nor disagree <i>n</i> (%)*	Somewhat disagree <i>n</i> (%)*	Strongly disagree <i>n</i> (%)*	Missing <i>n</i>
"The oral cavity is a difficult area of the body to clean"	29 (13.6)	74 (34.4)	20 (9.4)	29 (13.6)	61 (28.6)	2
Oral care is a very high priority for mechanically ventilated patients"	201 (93.5)	11 (5.2)	0	1 (0.5)	0	2
"I find cleaning the oral cavity to be an unpleasant task"	4 (1.9)	33 (15.4)	19 (8.9)	33 (15.4)	125 (58.4)	1
"No matter what I do, the mouths of the most of ventilated patients seem to get worse the longer they are on the ventilator"	34 (16.3)	49 (23.6)	29 (13.9)	51 (24.5)	45 (21.6)	7
"There are more important tasks to do to the unstable patient than oral care"	22 (10.5)	49 (23.3)	21 (10.0)	45 (21.4)	73 (34.8)	5

*The valid percentage was used. ICU: Intensive care unit

Table 3: ICU nurses' response regarding hospital supplies and support

Questionnaire statements	Strongly agree <i>n</i> (%)*	Somewhat agree <i>n</i> (%)*	Neither agree nor disagree <i>n</i> (%)*	Somewhat disagree <i>n</i> (%)*	Strongly disagree <i>n</i> (%)*	Missing <i>n</i>
"I have adequate time to provide oral care at least once a day"	161 (75.2)	21 (9.8)	4 (1.9)	1 (0.5)	27 (12.6)	1
"I have been given adequate training in providing oral care"	165 (77.5)	40 (18.6)	3 (1.4)	2 (0.9)	3 (1.4)	2
"There are supplies readily available to provide oral care in our unit"	155 (72.8)	51 (23.9)	6 (2.8)	0	1 (0.5)	2
"The toothbrushes provided by the hospital are suitable for our patients"	65 (30.2)	79 (37.4)	39 (18.5)	14 (6.6)	14 (6.6)	4

*Valid percentage was used. ICU: Intensive care unit

Table 4: Demographic data of the participants (n = 215)

Demographic variables	n (%)
Participant's level of education	
Nursing diploma program	73 (34.3)
Bachelor's degree or more	140 (65.7)
Missing	2
Type of shift	
Day	103 (77.4)
Night	30 (22.6)
Missing	82
ICU type	
Medical/multidisciplinary	148 (70.5)
Surgical	44 (21.0)
Pediatrics	5 (2.4)
Cardiac	8 (3.8)
Neurological	2 (1.0)
Other	3 (1.4)
Missing	5

*This table is a property of American Journal of Infection Control (Alotaibi AK, Alshayiqi M, Ramalingam S. Does the presence of oral care guidelines affect oral care delivery by intensive care unit nurses? A survey of Saudi intensive care unit nurses. Am J Infect Control 2014;42:921-2). ICU: Intensive Care Unit

regarded as the most likely mechanism of transmission, mean 7.07 (SD \pm 2.46) [Table 1]. Comparing the knowledge of the participants to their level of education, there was no statistically significant difference between the two groups of nurses (nursing diploma versus bachelor's degree or higher) ($t = 0.34$, $P = 0.74$).

Intensive care unit nurses' attitudes and availability of oral care supplies

Majority of the participants agreed that the oral cavity was a difficult anatomic area to clean (48.4%, $n = 103$) and that oral care is a high priority for mechanically ventilated patients (99.5%, $n = 212$). However, 33.8% ($n = 71$) of the participants reported that there were more important tasks than oral care delivery, especially when patients were unstable [Table 2]. Regarding availability of oral care supplies and support from the hospitals, majority of the nurses (96.7%) reported their agreement and satisfaction with their respective institutions [Table 3].

Healthcare quality accreditation status of the institution

Of the 10 hospitals included in this study, six hospitals had healthcare quality accreditation from international organizations (4 from the JCI and 2 from the ACI). There was no statistically significant difference in the knowledge between nurses working in accredited and nonaccredited hospitals ($P = 0.4$, $t = 0.83$). Furthermore, no significant difference was found between the two groups with regard to their attitudes ($P = 0.89$, $t = 0.12$). Although, the attitudes of ICU nurses working in ACI accredited hospitals (mean = 4.03) were slightly higher than the nurses attached to JCI accredited hospitals (mean = 3.72). Nevertheless, the difference was

not statistically significant ($P = 0.19$, $t = 2.39$). Similarly, when comparing the satisfaction levels of the nurses in accredited and nonaccredited hospitals with regard to the availability of oral care supplies and support, no statistically significant difference could be identified ($P = 0.38$, $t = 0.86$).

Discussion

The main purpose of this study was to report the ICU nurses' knowledge and attitudes regarding oral care provided to mechanically ventilated patients. It was also aimed at determining the baseline level of knowledge and attitudes regarding the importance of oral care for intubated patients among ICU nurses in Saudi Arabia.

Based on the scoring by nurses for the scenario evaluating their knowledge about the development of VAP, it was found that most of the nurses were aware of the mechanisms of transmission from a contaminated oral cavity, regardless of their level of education. The most likely mechanism of transmission reported by the nurses in the present study was, "aspiration of contaminated secretions from the oropharynx" (mean = 7.07). This was similar to the outcomes of a study reported from Johannesburg, South Africa, which using a similar scenario and statements regarding mechanisms of transmission (mean = 7.0).^[12]

While the attitudes scoring of the nurses reflected their beliefs regarding the importance and priority of oral care in mechanically ventilated patients, majority of the nurses felt that cleaning the oral cavity is difficult and can be ineffective with the increased duration of mechanical ventilation. This dilemma may suggest that new techniques and/or instruments are needed to achieve more efficient oral care for mechanically ventilated patients and at the same time be comfortable to the nurses to deliver.

Regarding the effect of the healthcare quality accreditation, only 6 of the 10 hospitals in the present study were accredited by international accrediting organizations (4 by JCI and 2 by ACI). Both the organizations emphasize the importance of improving patient safety and quality in health care delivery in their mission statements.^[17,18] However, there was no statistical difference in knowledge and attitudes between ICU nurses working in accredited and nonaccredited hospitals in the present study. This makes it alluring to hypothesize that regardless of the healthcare quality accreditation status, the knowledge and attitudes of ICU nurses regarding oral care delivery to mechanically ventilated patients is based more on the competency of the personnel involved rather than the institution itself.

Limitations

This is a cross-sectional study in the form of a survey, which may limit the factors that affect the nurses and their knowledge, which if made detailed can reduce the nurses' participation.

Recommendations

1. Further studies directed toward investigating the factors affecting the nurses' oral care in regards to mechanically ventilated patients should be carried out to explore different areas of this field and improve the overall healthcare system.
2. There is a definitive need for more randomized controlled clinical trials to study the effectiveness of current oral care practices and the development of new effective techniques with the involvement of the nurses in their development to achieve higher levels of clinical application.

Conclusion

Our results fell nearly identical to other studies, with the healthcare quality accreditation status of the hospital proving no statistical significance in attitudes or knowledge of the ICU nurses in regard to mechanically ventilated patients. Factors affecting oral care delivery should be evaluated on the personal and institutional level to achieve better understanding of them.

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Conflicts of interest

There are no conflicts of interest.

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