

## Performance of ICU Nurses in Providing Respiratory Care

### Abstract

**Background:** Failure to provide proper respiratory care leads to incidence of certain complications such as ventilator-associated pneumonia. Nurses have a crucial role in providing this care. The aim of this study is to assess the performance of ICU (Intensive Care Unit) nurses in providing respiratory care. **Materials and Methods:** The present descriptive cross-sectional study recruited 120 nurses working in selected hospitals affiliated to Isfahan University of Medical Sciences from March to August 2016. The questionnaire used included demographic and employment details and performance observation checklist (containing 39 items in four care domains) based on recommendations in clinical guidelines. The performance of each nurse during a working shift was observed. Data were analyzed by SPSS 18, using tables of frequency, mean, and standard deviation. **Results:** According to the results obtained, mean (SD) total performance score of nurses in providing respiratory care was 15.46 (2.16). The highest score was obtained in preventing contamination of respiratory equipment 5 (0), and the lowest score was in oral care 0.68 (0.73). **Conclusions:** Considering that respiratory care is one of the main pillars of patient care in ICU and that nurses scored poorly in this area, it is imperative to pay greater attention to this area. It is essential to provide necessary training to nurses and adequate facilities for improving the quality of clinical care.

**Keywords:** Intensive care unit, nursing, respiratory care

### Introduction

Because of their lethargy, weakened defense mechanisms and prolonged hospitalization, and especially endotracheal intubation and ventilator-assisted breathing, patients in intensive care units are exposed to the risk of infection.<sup>[1]</sup> The respiratory system has a determining role in maintaining vital human processes; thus, the respiratory system management is the first factor in successful care of Intensive Care Unit patients.<sup>[2,3]</sup> Respiratory care is one of the most important nursing care in ICU.<sup>[4]</sup> Respiratory care include suctioning airways, oral care, oxygen therapy, respiratory monitoring, and care related to the prevention of ventilator-associated pneumonia (VAP).<sup>[5]</sup> Many studies have indicated complications caused by improper respiratory care in ICU,<sup>[6]</sup> for instance, VAP.<sup>[7]</sup> Statistics published in Iran suggest that 10% of patients undergoing general surgery, 20% of patients with endotracheal intubation, and 70% of those with acute respiratory distress suffer pneumonia during their stay in ICU.<sup>[7]</sup> The results of a study on suctioning revealed nurses'

poor knowledge and performance and also non-compliance of suctioning procedure with the standard method.<sup>[8]</sup> Several studies have shown that nurses frequently fail to perform such care for various reasons such as not knowing positive results of using the standard method, absence of standard instructions, low nurse/patient ratio, and lack of supervision although they are well aware of respiratory care.<sup>[9-11]</sup> Besides, improper respiratory care spreads a variety of infections and complications, and also prolongs hospital stay and costs incurred.<sup>[12,13]</sup> Studies conducted in Europe and America estimate VAP-associated costs between 30 and 40 thousand dollars per patient. Another report indicates that only in America, these infections lead to more than 1.75 million extra days of hospitalization and 1.5 billion dollars of additional costs.<sup>[14,15]</sup> Moreover, prolonged use of mechanical ventilation may cause complications such as respiratory infection, and thus makes it hard to wean the patients from mechanical ventilation.<sup>[16,17]</sup> Nurses are more in touch with the patient and patient monitoring systems than other members of the medical team, and because of the

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sensitive and critical nature of ICU, precise respiratory care of patients is one of the main pillars of nursing care in these units.<sup>[18,19]</sup> Nursing is one of the biggest sources of workforce in the national healthcare. Nurses directly influence patient care and its outcomes,<sup>[20]</sup> and because of their direct contact with patients, they are expected to have a key role in respiratory care and the prevention of nosocomial infections.<sup>[21]</sup> Given the importance of saving patients' lives, the enormous sensitivity of ICU, and the importance of performing nursing care according to standard principles, and considering that no comprehensive study has been conducted to assess performance of ICU nurses in relation to respiratory care, the present study was conducted with the aim to assess performance of ICU nurses in teaching hospitals in Isfahan. The present study results can be used by nursing authorities and managers in educational planning and enhancing the quality of nursing care according to current standards.

## Materials and Methods

In the present descriptive cross-sectional study, performance of 120 ICU nurses of selected hospitals affiliated to Isfahan University of Medical Sciences was observed in 2016. It is worth noting that the studied hospitals matched in terms of employment status and performance of nurses. Sample size was determined according to a similar study,<sup>[7]</sup> and using sample size equation based on mean and standard deviation at significance level of  $\alpha = 5\%$  and power of 80% and effect size of  $d = 0.33$ . Samples were selected by convenient sampling.

Study inclusion criteria included nurses with bachelor's degree and higher qualifications, and exclusion criteria included unwillingness to take part and transfer to other departments. The researcher-made questionnaire of the performance of nurses in respiratory care comprised a demographic details form and a performance observation checklist with 39 items, including airway care (21 items), the prevention from contamination of respiratory equipment (5 items), oral care (5 items), and pneumonia prevention (8 items). The questionnaire used in the present study was developed after considering recommendations in the field of nursing and careful review of clinical guidelines from accredited centers concerning respiratory care such as: the Center for Control and Prevention of Diseases in America,<sup>[22]</sup> Institute of Health Promotion.<sup>[23]</sup> Hong Kong Center for Protection of Health,<sup>[24]</sup> the Canadian Association of Medical Microbiology and Infectious Diseases,<sup>[25]</sup> and the Center for Monitoring Preservation of Health in Ireland.<sup>[26]</sup> The items in observational checklist were scored one for Yes and zero for No, such that correct performance scored one and incorrect one scored zero.

Criterion and construct validities of the tool assessed by ten faculty members from Nursing and Midwifery School and three ICU experts. Reliability of the tool was assessed by intraobserver reliability, such that performance of 10 nurses was concurrently observed by researcher and an assistant

(a nursing student) using the observation checklist, and an acceptable Intra-class Correlation Coefficient of 92% was found. Performance of each nurse during a working shift was assessed once using observation checklist, and one point was given to a correct performance and zero to an incorrect performance. Each nurse scored between 0 and 390 points. SPSS software (version 16, SPSS Inc., Chicago, IL, USA) was used for data analysis. Since the presence of the researcher could affect nurses' performance, the observer continually attended the ward for long periods of time in different working shifts to make her presence normal and to observe nurses' actual performance.

## Ethical considerations

Approval to conduct the study was granted by the ethics committee of Isfahan University of Medical Sciences (ethics code: 295013), and written informed consents were obtained from samples at the beginning of the study.

## Results

In the present study, 120 nurses aged between 22 years and 48 years, with mean (SD) age of 30.42 (5.84) years took part, of whom, the majority were female (89.25%), and 93.34% had bachelor's degree education. The majority (93.30%) worked rotational shifts, 45.87% had between 1 and 5 years of work experience, and the majority (36.49%) were passing their obliged service period [Table 1].

According to the results obtained, mean (SD) total score of respiratory care was 15.46 (2.16). The highest score (100%) was related to the prevention from contamination of respiratory equipment, and the lowest (13.66%) to oral care [Table 2].

## Discussion

In the present study, nurses' performance was observed and assessed in five domains, including (hand hygiene,

**Table 1: Frequency and percentage of participating nurses according to demographic variables**

Variable	Variable levels	Number (%)
Gender	Male	13 (10.75%)
	Female	107 (89.25%)
Shift	Fixed	8 (6.70%)
	Rotational	112 (93.30%)
Work history	Less than 1 year	25 (20.88%)
	1 to 5 years	55 (45.87%)
	5 to 10 years	29 (24.23%)
	More than 10 years	11 (9.02%)
Type of employment	Formal	2 (1.71%)
	Contract	24 (20%)
	Clause 3	33 (27.52%)
	Company	17 (14.28%)
	Obliged service	44 (36.49%)
Education	Bachelor's degree	112 (93.34%)
	Master's degree	8 (6.66%)

**Table 2: Performance of respiratory care in ICUs of selected hospitals**

	Number of nurses	Minimum	Maximum	Mean (Standard deviation)	Total percentage
Care of airways	120	3	14	7.09 (1.94)	33.76
Prevention from contamination of respiratory equipment	120	5	5	5 (0)	100
Oral care	120	0	2	0.68 (0.73)	13.66
Prevention from VAP	120	2	5	2.69 (0.93)	33.62
Total score of respiratory care	120	11	23	15.46 (2.16)	39.64

suctioning, taking care of endotracheal tube cuff, and position change), oral care, prevention from contamination of respiratory equipment and prevention from VAP, and the highest mean score related to the prevention from contamination of respiratory equipment. In a study conducted in Shiraz by Yazdani *et al.*, performance of nurses in preventing VAP was assessed using a questionnaire whose items had been extracted from the clinical guidelines for control and prevention of diseases, and prevention from contamination of respiratory equipment had a high score of 82%,<sup>[27]</sup> which agreed with the present study results. In the present study, patient's respiratory equipment was changed when it was clearly contaminated. Oral care is another component of respiratory care.<sup>[6]</sup> Thus, patients' oral hygiene is essential, and brushing teeth and use of chlorhexidine mouthwash can help.<sup>[28]</sup> According to the results obtained, the poorest performance was in oral hygiene (13.66%), and although oral care of patients under mechanical ventilation is among duties of trained nurses, it was found to have lower care priority in the hospitals studied, and nurses had inappropriate oral hygiene protocol and often delegated this task to patient care technicians. In a study conducted by Adib Haj Bagheri and Ansari, oral care was also found to have a low priority in view of nurses, and most nurses revealed that they had not received adequate training in this area.<sup>[29]</sup> Behesht Aeen *et al.* conducted a study on the prevention of pneumonia, and found the weakest performance in oral care, which agrees with the present study results.<sup>[7]</sup> In a qualitative study conducted in Hong Kong by Chui and Yeung, nurses believed the fear of performing oral hygiene, its low priority, and lack of adequate support for performing this task were the barriers to performing oral hygiene.<sup>[30]</sup> Next to oral hygiene, the weakest performance was in the prevention of VAP (33.62%). The present study results agree with those obtained by Behesht Aeen *et al.*, who stated that the majority of nurses (66.40%) performed poorly in the prevention of VAP.<sup>[8]</sup> The present study results showed that ICU nurses had a poor performance and did not completely follow the clinical guidelines for the prevention of VAP. A study by Jordan and colleagues also showed that nurses' performance in the prevention of VAP is poor.<sup>[10]</sup> This problem appears to be affected by issues such as lack of time and facilities, shortage of workforce, absence of a plan and knowledge of nurses about proper care of patients under mechanical ventilation.<sup>[31]</sup> In the present study, airway care was also assessed as part of respiratory care, in which

nurses also performed poorly (33.76%). This domain included suctioning, cuff care, and contact precautions. In a study conducted by Behesht Aeen *et al.*, nurses had poor performance regarding cuff care, which agrees with the present study results.<sup>[8]</sup> Mol *et al.* showed that 84% of nurses in public hospitals and 57% in private hospitals had inadequate knowledge about endotracheal tube cuff care.<sup>[32]</sup> In the present study, nurses performed poorly in measuring cuff pressure using a manometer and minimum air leakage method. This may be attributed to nurses' lack of knowledge about proper cuff care, and also to lack of facilities such as manometer. The results of this study indicate that nurses' performance of suctioning is not in accordance with the standards.

In a study conducted on suctioning by Johnson *et al.*, nurses performed poorly in this area, which agrees with the present study results.<sup>[3]</sup> Also, in consistence with the results of the present study, we can mention the results of Kelleher *et al.* and Ansari *et al.* that indicated poor performance of nurses in relation to suction.<sup>[33,34]</sup> A study by Thompson *et al.* in China found that 65% of nurses had a satisfactory performance, which differs from the present study, due to the fact that in this study open courses on airway care were performed as planned for nurses.<sup>[35]</sup>

The results of this study showed that suction is performed routinely in ICU, which may be due to the lack of knowledge of nurses about the procedures of lung auscultation, how to assess the patient's need for suction, and the benefits of this care. The results of Sole's study in the United States showed that patients who had suctioned after assess of the need for suction had a better result and fewer side effects than routine suctioning patients.<sup>[36]</sup>

The lack of special endotracheal tubes for suctioning subglottic secretions due to their high costs, also, the effect of using direct observation on the behavior of nurses, were the limitations of this study but the second item was beyond the researcher's control.

## Conclusion

According to the present study results, nurses performed poorly in respiratory care, which can be attributed to non-compliance with clinical guidelines, not involving nurses in the development and implementation of protocols, lack of necessary resources, high costs, and



lack of time, skills, and knowledge. The present study results are indicative of the fact that the nursing team requires training courses and educational protocols in relation to respiratory care. It is therefore recommended that evidence-based clinical guidelines about respiratory care be placed in ICUs, and hospital managers provide facilities needed for providing optimal services in hospitals.

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### Conflicts of interest

Nothing to declare.

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