

Intensive Care Unit Registered Nurses' Perceived Barriers Towards VAP Prevention in Southeast Iran: An Observational Study

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Research

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Abstract

Background: Health Care-Associated Infections are the most common complications in hospitalized patients. Ventilator-Associated Pneumonia is a subset of Healthcare-Associated Pneumonia. This study aimed to investigate the intensive care unit registered nurses' perceived barriers towards VAP prevention in southeast Iran.

Methods: This was a cross-sectional descriptive-analytical study investigating ICU registered nurses in hospitals affiliated to Kerman University of Medical Sciences, Kerman, Iran. The study population consisted of nurses in ICUs and EDs in three hospitals. The sample size was estimated as 242 nurses. The data was collected through a demographic characteristics questionnaire and a researcher-made ventilator-associated pneumonia barriers prevention questionnaire.

Results: Nurses' mean age was 32.9 ± 5.87 . 80.2% of the participants were female. The job experience mean score was 9.51 ± 5.14 years. 45% of nurses had received VAP prevention training. The mean score of nurses' perceived barriers towards VAP prevention was 2.82 ± 0.46 . The highest mean score of perceived barriers were related to items of "Lack of staff", "Lack of a team-based approach to care and interventions", and "Lack of support from Management".

Conclusions: According to the present study, most of the barriers mentioned were related to organizational factors such as lack of teamwork. One of the major problems of most Kerman hospitals seems to be the shortage of staff. Further studies are needed in Kerman and other cities of Iran to obtain more accurate results.

Background

Health Care-Associated Infections are the most common complications in hospitalized patients. Although Intensive Care Units (ICUs) account for about 5–15% of hospital beds, they account for more than 30% of hospital-acquired infections. Ventilator-Associated Pneumonia (VAP) is a subset of Healthcare-Associated Pneumonia that develops 48 hours or longer after intubation and being under Mechanical Ventilation (MV) (1).

VAP is associated with serious complications such as morbidity, mortality, prolonged ICU stay, nursing workload increase, and financial problems (2). It is estimated that the incident will increase the length of hospital stay in ICUs by 14 days, with a mortality rate of 9–13%, and it is expected to bring an additional cost of 41,000 USD (3–5).

Paying attention to VAP is a serious challenge for ICU nurses, and its prevention has been reported as a priority in these units (6). Previous studies have shown that the prevention of VAP improves the patients' condition and affects their quality of life. Also, strategies to prevent VAP are efficient, and thereby reduce the costs incurred on the health care systems (7). Soni and Mehta (2017) reported that prevention measures for VAP are important components of the nursing care plan among ICU nurses (8). Recently, the

prevention of VAP has also been included as a component of patient safety guidelines (2), and it should be noted that in many health care systems, safety is considered as an indicator for quality improvement and criteria for evaluating ICUs (9, 10).

Since many factors might impede prevention in any field, studies have tried to evaluate the barriers to the prevention of VAP. Sole (2005) reported factors such as a shortage of time, lack of equipment, costs, and personnel as barriers to the prevention of this type of pneumonia (11). Studies exploring the barriers to the quality of care and its evidence-based core in various units, including ICU, have reported the most important barriers to oral care in ICUs as poor management and supervision, maladaptation, lack of time, insufficient staffing, and the gradual loss of their knowledge and lack of a standard protocol for care (12). In their study, Ricart et al. (2003) identified the most significant barriers to the adherence to evidence-based guidelines for the prevention of VAP in ICUs as unavailability of resources, patient discomfort, disagreement with reported trial results, fear of potential adverse effects, and costs. The most important barriers to adherence were environment-related (13). The results of Jansson et al. (2013) indicated that the performance of More experienced nurses was significantly better than their less-experienced colleagues. They reported the overall, self-reported adherence as 84.0%, and the main self-reported barriers towards evidence-based guidelines were inadequate resources and disagreement with the results as well as lack of time, skills, knowledge, and guidance (7).

Given the importance of VAP and the consequences of this infection in ICUs and considering nurses as one the most important members of the health care team, the results of such studies enhance nurses' knowledge and help them play a more effective role by using appropriate prevention methods. Therefore, this study aimed to investigate the intensive care unit registered nurses' perceived barriers towards VAP prevention in southeast Iran.

Materials And Methods

Study Design and Setting

This was a cross-sectional descriptive-analytical study investigating ICU registered nurses' perceived barriers towards VAP prevention in hospitals affiliated to Kerman University of Medical Sciences, Kerman, Iran.

Sample Size and Sampling

All nurses in ICUs and Emergency Departments (EDs) of Shafa, Bahonar, and Afzalipour Hospitals formed the study population. According to the information obtained from these hospitals, there were 321 nurses (Shafa = 77, Bahonar = 112, and Afzalipour = 132) at the time of the study. The sample size was estimated based on the pilot study as 242 nurses, by a confidence coefficient of 95% and the power of 80.

Inclusion criteria were a) having B.Sc. or higher degree; b) job experience of six months in ICUs. The participants were excluded if they voluntarily withdrew from the study or avoided sharing their experiences. Eligible nurses were selected by quota sampling method from each unit and shift, according to its specified proportion.

Measures

The data was collected through a 2-part researcher-made questionnaire.

Demographic Characteristics Questionnaire: This questionnaire included age, sex, education, unit name, job experience, experience of working in ICUs, and having training courses on VAP as well as the type of protocols they adhere to (hand hygiene, oral care and suctioning).

Ventilator-Associated Pneumonia Barriers Prevention Questionnaire: This questionnaire contained 18 items with 4-point Likert scales (one = strongly disagree, four = totally agree). It was developed using various sources in the literature (2, 7, 8, 11). The minimum and maximum score of the questionnaire was 18 and 72, respectively. The higher the average score of each item represents that the barrier was perceived more by nurses. The validity of the questionnaire was evaluated between 0.85 to 1 by giving the questionnaire to 10 faculty members of Kerman University of Medical Sciences, and for the reliability, the questionnaire was provided to 30 target populations. Internal consistency was calculated using Cronbach's alpha ($\alpha = 0.95$).

Data collection and Analysis

After obtaining necessary permissions, the researcher referred to the research setting and started sampling. The eligible nurses were invited to participate in the study. After giving explanations about the process of the study, written consent was taken. Then, the questionnaires were given to nurses to be completed in the form of self-report. Two hundred forty-two nurses were enrolled in the study starting from January to May 2017, lasting for five months, and there were no dropouts.

Data were analyzed by SPSS version 18 (SPSS Inc., Chicago, IL, USA). Descriptive statistics (frequency, percentage, mean, and standard deviation) were applied to describe the participants' demographic characteristics. The repeated measure ANOVA and Independent t-test or their nonparametric equivalents Mann-Whitney U test and Kruskal-Wallis test were used to compare the mean scores between nurses' demographic characteristics and their perceived barriers towards VAP prevention. The significance level of the p-value was considered to be 0.05.

Ethical Consideration

The study protocol was approved by the Ethics Committee of Kerman University of Medical Sciences (IR.KMU.REC.1395.908). The study objectives were presented to all participants before their enrollment, and the written informed consent was taken. All participants were assured that all information was confidential, and their participation was optional, and they could withdraw from the study at any time.

Results

Two hundred forty-two nurses enrolled in the study and completed the questionnaires. Nurses' mean age was 32.9 ± 5.87 (min = 22, max = 50), that 43% of them were 30 years old or younger. 80.2% of the participants were female. Only eight nurses had M.Sc., and the rest had B.Sc. Most of the nurses 66.1% were in ICUs, and the rest were in the ED. The job experience mean score was 9.51 ± 5.14 years (min = 1, max = 27), and the mean experience of working in ICUs was 6.33 ± 3.7 (min = 1, max = 20) (Table 1).

Table 1
Participants Demographic characteristics

Variables	Frequency	Percentage
Age (year)		
≤ 30	104	43
31–40	115	47.5
40 <	23	9.5
Sex		
Female	194	80.2
Male	48	19.8
Education		
B.Sc.	234	96.7
M.Sc.	8	3.3
Position		
Nurse	240	99.2
Head nurse	2	0.8
Unit name		
ICU	160	66.1
ED	82	33.9
Job experience (year)		
≤ 5	121	50
6–10	93	38.4
11–15	24	9.9
15 <	4	1.7
Experience of working in ICUs or EDs (year)		
≤ 5	121	50
6–10	93	38.4
11–15	24	9.9
15 <	4	1.7

According to Table 2, 89.7% of the nurses had passed infection control training courses; 53.7% had been trained in the last six months from the time of sampling. Also, 45% had received VAP prevention training, and 35.8% had been trained in the last six months. 83.4% of nurses stated that they adhered to a specific protocol for VAP prevention, of which 44.2% adhered to all three of hand hygiene, oral care and, suctioning protocols. 66.1% reported that nurses do not report to the authorities about the number of patients with VAP (Table 2).

Table 2
Participants' experience of training courses and their adherence to protocols.

Items	Frequency	Percentage
1. Have you passed any nosocomial infection control training courses?		
Yes	217	89.7
No	25	10.3
2. If the answer to the previous question is Yes, specify the time. *		
The last 6 months	116	53.7
Between the last 6 to one year	70	32.4
More than a year	30	13.9
3. Have you had VAP prevention training?		
Yes	109	45
No	133	55
4. If the answer to the previous question is Yes, specify the time.		
The last 6 months	39	35.8
Between the last 6 to one year	46	42.2
More than a year	24	22
5. Do you follow a specific procedure or protocol for preventing VAP? *		
Yes	201	83.4
No	40	16.6
6. If the answer to the previous question is Yes, specify the protocol.		
Oral care protocol	8	4
Suctioning protocol	29	14.4
Hand hygiene protocol	43	21.4
All three protocols	89	44.2
Oral care and Suctioning protocols	4	2
Oral care and Hand hygiene protocols	4	2
Suctioning and Hand hygiene protocols	24	12
7. Do nurses report periodically to authorities about the number of patients with VAP?		

Items	Frequency	Percentage
Yes	82	33.9
No	160	66.1
8. Have you been asked, directly or by the Nursing and Medical Administrators, to use VAP prevention procedures?		
Yes	89	36.8
No	153	63.2
* There was a missing data.		

The mean score of nurses' perceived barriers towards VAP prevention was 2.82 ± 0.46 (minimum mean = 1.1, maximum mean = 4). According to Table 3, the highest mean score of perceived barriers were related to items of "Lack of staff" (3.1 ± 0.7), "Lack of a team-based approach to care and interventions" (2.93 ± 0.77), and "Lack of support from Management" (2.91 ± 0.69) (Table 3).

There was no significant correlation between the mean score of nurses' perceived barriers towards VAP prevention and any of the demographic characteristics.

Table 3
Participants' respond to Ventilator Associated Pneumonia Barriers Prevention Questionnaire

Items	Mean	SD	Agree and Totally Agree		Disagree and Strongly Disagree	
			Frequency	Percentage	Frequency	Percentage
1. Lack of funding and facilities.	2.8	0.7	64	26.5	178	73.5
2. Improper physical structure of the unit.	2.86	0.73	61	25.2	181	74.8
3. Lack of time.	2.9	0.73	55	22.7	187	77.3
4. Lack of staff.	3.1	0.70	37	15.3	205	84.7
5. Lack of a team-based approach to care and interventions.	2.93	0.77	66	27.3	176	72.7
6. Lack of a specific protocol for doing the procedures.	2.83	0.78	80	33	162	70
7. Disagreement on protocol recommendations.	2.8	0.74	81	33.5	161	66.5
8. Lack of support from Management.	2.91	0.69	57	23.6	185	76.4
9. Insufficient skill.	2.73	0.81	93	38.4	149	61.4
10. Inadequate knowledge and lack of information.	2.81	0.83	78	32.3	164	67.7
11. Inability to use clinical research findings in clinical environment.	2.79	0.76	78	32.2	164	67.8
12. Inability to use devices for VAP prevention.	2.79	0.78	76	31.4	166	86.6
13. Lack of familiarity with VAP prevention protocols.	2.8	0.76	72	29.7	170	70.3
14. The existence of unnecessary procedures.	2.78	0.71	75	31	167	69
15. Deterioration of the patient's condition.	2.81	0.75	72	29.8	170	70.2
16. The concern of harming the patient.	2.69	0.74	94	38.8	148	61.2

Items	Mean	SD	Agree and Totally Agree		Disagree and Strongly Disagree	
			Frequency	Percentage	Frequency	Percentage
17. The concern of detachment of attached tubes to the patient.	2.67	0.72	96	39.6	146	60.4
18. The concern of the side effects it has on the patient.	2.69	0.73	94	38.8	148	61.2

Discussion

The mean score of nurses' perceived barriers towards VAP prevention was 2.82 ± 0.46 , which was higher than the median of the questionnaire ranges of scores (1 to 4; Median = 2.5). The highest mean score of perceived barriers were related to items of 'Lack of staff', 'Lack of a team-based approach to care and interventions', 'Lack of support from Management', and 'Lack of time' which indicate that most perceived barriers were related to the organization of the health care system. The lowest mean scores of perceived barriers were related to items of 'The concern of detachment of attached tubes to the patient', 'The concern of harming the patient', and 'The concern of the side effects it has on the patient'. It seemed that from nurses' point of view, perceived barriers towards VAP prevention were more related to the management of the system than the procedures or nurses. Such results could be because the barriers towards VAP prevention were only collected from the nurses' point of view. It may also be due to the shortage of nursing staff in the ICUs under study, which makes having team-based approaches hard or even impossible.

Reviewing literature, the results of Soni and Mehta's study on 136 ICU nurses indicated that the major nurses' perceived barriers towards prevention of VAP were lack of adequate resources, inadequate staff, and lack of time which was only in line with the results of this study regarding staff shortage and lake of time (8). In Rashnou et. al.'s descriptive qualitative study conducted on twelve critical care nurses in Iran, the major barriers to VAP management were low quality of working life (unprofessional practice and lack of opportunities for learning and skill development) and poor organizational culture (supervision and control, organizational relations, and managerial support). The results of Rashnou et. al.'s study were consistence with the results of this study regarding managerial support and organizational relations which could be due to the same health care system sets in the country (2). The study by Jansson et al. in Finland on 101 critical care nurses revealed that the main barriers towards the prevention of VAP were inadequate resources which was not consistence with the results of this study. Also, lack of staff and patient-related barriers were in the least important barriers which were totally in the opposite of the results of this study. This inconsistency could be because of different health care system sets in two countries (7).

Conclusions

According to the present study, most of the barriers mentioned were related to organizational factors such as lack of teamwork. One of the major problems of most Kerman hospitals seems to be the shortage of staff. Therefore, it is obvious that due to the current conditions of Kerman hospitals, there was no significant correlation between the mean score of nurses' perceived barriers towards VAP prevention and any of the demographic characteristics. On the other hand, since no similar study has been found in this field, the results of the present study cannot be confirmed or rejected. Further studies are needed in Kerman and other cities of Iran to obtain more accurate results.

Abbreviations

ICU: Intensive Care Unit(s)

VAP: Ventilator-Associated Pneumonia

ED: Emergency Department(s)

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Ethics Committee of Kerman University of Medical Sciences (IR.KMU.REC.1395.908). The study objectives were presented to all participants before their enrollment, and the written informed consent was taken.

Consent for publication

The written informed consent and consent for publication was taken from each individual for the study.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

All authors had fully contributed to the study design and the preparation of the article.

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