

Ventilator-Associated Complications: A Study to Evaluate the Effectiveness of a Planned Teaching Program for Intensive Care Unit Staff Nurses

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Abstract

Aim: The aim of the present study was to assess the knowledge of nurses working in an intensive care unit for at least 6 months regarding ventilator-associated complications and its prevention.

Methods: The present study was conducted in Department of Trauma and Emergency. All staff nurses working in the ICU were included in the study. 50 staff nurses were included in the study.

Results: Age wise distribution of sample reveals that majority 74% within the age group of 22-25 years and 26% were in the age group of 26-30 years. Gender distribution of sample reveals that about 68% were female. While 32% were male. The percentage distribution of patients in educational qualification shows that among 54% were B.B.sc. and 44% were RGNM. The year of work experience was 96% between 1-5 years and 4% between 6-10 years, respectively. Most of the samples 29 (58%) were having average knowledge, 12 (22%) were having poor knowledge and 9 (18%) were having good knowledge regarding VAP. Most of the samples 47 (94%) were having good knowledge, 3 (6%) were having average knowledge regarding VAP. The pretest and post test knowledge score among staff nurses the pretest mean score was 11.519 with SD 2.648 and post-test mean score was 16.634 and SD 2.528 and the mean difference was 6.114 and calculated t value was 17.713 which was statistically significant at level of <0.001.

Conclusion: The current study showed that the nurses had satisfactory total knowledge at the pre-program implementation, indicating that the respondents lacked knowledge. However, the score of total knowledge increased immediately after the planned teaching program, indicating that the nurses gained knowledge after the teaching program.

Keywords: Ventilator Associated Complications, Prevention, Intensive Care Unit.

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Introduction

Ventilator-associated pneumonia (VAP) is the most common healthcare-associated infection in adult critical care units. It is associated with increased intensive care unit (ICU) stay, patient ventilator days, and mortality. [1] Ventilator-associated pneumonia (VAP) is defined as pneumonia that occurs 48–72 hours or thereafter following endotracheal intubation, characterized by the presence of a new or progressive infiltrate, signs of systemic infection (fever, altered white blood cell count), changes in sputum characteristics, and detection of a causative agent. [2]

The mortality rate for Ventilated associated Pneumonia ranges between 27 and 76%. Pseudomonas or Acinetobacter pneumonia is

associated with higher mortality rates than those associated with other organisms. Studies have consistently shown that a delay in starting appropriate and adequately dosed antibiotic therapy increased the mortality rates. Furthermore, VAP has been associated with prolonged ICU length of stay and higher costs for medical care since ICUs incur an important part of hospital expenses. Therefore, prevention of VAP could reduce the care utilized during hospitalization and decrease resource utilization and subsequent expenses. [3]

The prevention of ventilator Assisted Pneumonia (VAP), a hospital acquired infection, among intensive care patients is a major clinical challenge. It is a condition that is associated with high rates of

morbidity, mortality, length of stay and hospital costs. Throughout empirical observation, Nurses' lack of knowledge may be a barrier to adhere to evidenced based guidelines for preventing ventilator-associated pneumonia and translating evidence based findings into consistent delivered care at the bedside remains a challenge. An infection occurring in a patient during the process of care in a health-care facility which was not present or incubating at the time of admission. This includes infections acquired in the hospital but appearing after discharge, and also occupational infections among staff. Such infections include urinary tract infection, ventilator associated pneumonia, surgical site infection and blood stream infection. [4]

According to the Center for Disease Control and Prevention (CDC, 2012), Ventilator associated pneumonia (VAP) is that type of pneumonia developing 48 hours post intubation. It is diagnosed by the presence of a number of indicators including; manifestations of pulmonary infection as; presence of a disturbance in body temperature $> 38^{\circ}\text{C}$ or $< 36^{\circ}\text{C}$, leukocytosis and purulent tracheal secretions, new or persistent infiltrates detectable on chest radiographs, and positive deep tracheal aspiration culture. [5]

The aim of the present study was to assess the knowledge of nurses working in an intensive care unit for at least 6 months regarding ventilator-associated complications and its prevention.

Materials and Methods

The present study was conducted in Department of Trauma and Emergency, IGIMS, Patna, Bihar, India for one year. All staff nurses working in the ICU were included in the study. 50 staff nurses were included in the study.

Inclusion Criteria

1. Willing to participate in the study.

Table 1: Distribution of samples according to their sociodemographic variables

	Variables	F	%
Age (Years)	22-25	37	74
	26-30	13	26
Gender	Male	16	32
	Female	34	68
Educational Qualification	RGNM	22	44
	B.B.sc.	27	54
	P.B.B.sc.	1	2
Year of work Experience	1-5 years	48	96
	6-10 years	2	4

Age wise distribution of sample reveals that majority 74% within the age group of 22-25 years and 26% were in the age group of 26-30 years. Gender distribution of sample reveals that about 68% were female. While 32% were male. The

2. Have completed diploma in nursing or Bsc nursing degree.
3. Working in medical, surgical intensive care units

Exclusion Criteria

1. Having speciality courses in respiratory care.
2. Not present at the time of data collection.
3. Working in outpatient department and General other wards

Description of the Tool

Section-A: It consists of age, sex, qualification, working area, year of experience and previous source of information.

Section-B: It consists of structured knowledge questionnaire regarding Ventilator Associated Pneumonia.

A planned teaching program was developed based on related literature regarding VAC and its prevention and was presented to the staff nurses in groups. Each such session lasted 55-60 minutes. On the first day, a pretest was administered using a self-conducted structured questionnaire followed by a planned teaching program. On the fifth day, a post-test was conducted by using the same structured questionnaire to determine effectiveness of the planned teaching program. The average time for solving the questionnaire was 45-60 minutes.

Statistical Analysis

Descriptive statistics was used to explain the demographic variables and to compute the level of knowledge. Paired t test was used to find out the difference in knowledge between pretest and post-test. To test the association between demographic variables with post-test knowledge scores, the χ^2 test was used. All statistical analyses were done in SPSS version 17 (IBM-SPSS Inc, Armonk, NY).

Results

percentage distribution of patients in educational qualification shows that among 54% were B.B.sc. and 44% were RGNM. The year of work experience was 96% between 1-5 years and 4% between 6-10 years, respectively.

Table 2: Pretest Knowledge score among Staff nurses regarding Ventilator associated pneumonia (VAP)

Grades	Score	Frequency	Percentage
Poor	0-8	12	24
Average	9-12	29	58
Good	13-20	9	18

Most of the samples 29 (58%) were having average knowledge, 12 (22%) were having poor knowledge and 9 (18%) were having good knowledge regarding VAP.

Table 3: Post-test Knowledge score among Staff nurses regarding Ventilator associated pneumonia (VAP)

Grades	Score	Frequency	Percentage
Poor	0-8	0	0
Average	9-12	3	6
Good	13-20	47	94

Most of the samples 47 (94%) were having good knowledge, 3 (6%) were having average knowledge regarding VAP.

Table 4: Comparison of pretest and post-test knowledge score among staff nurses

	Mean	SD	Mean Difference	t value	Significant
Pre test	11.519	2.648	6.114	17.713	<0.001
Post test	16.634	2.528			

The pretest and post-test knowledge score among staff nurses the pretest mean score was 11.519 with SD 2.648 and posttest mean score was 16.634 and SD 2.528 and the mean difference was 6.114 and calculated t-value was 17.713 which was statistically significant at level of <0.001.

Discussion

Complications associated with mechanical ventilation include ventilator-associated pneumonia (VAP), airway complications, gastrointestinal hemorrhage, cardiovascular complications, equipment failure-related complication, ventilator-associated lung injury, and failure of closure of tracheal stoma. It is extremely important that intensive care unit (ICU) nurses have knowledge of strategies and guidelines to achieve quality care and contribute to improved patient outcomes. In India it affects 9-27% of intubated patients and doubles the risk of mortality as compared with similar patients without VAP. VAP may account for up to 60% of all Healthcare-Associated Infections. VAP prolongs ICU length of stay and increases the risk of morbidity and mortality in critically ill patients. [6-7] Considering the severity and impact of VAP, and the higher risks of HAIs in resource, the lower level of knowledge and compliance implies the need for ongoing educational interventions and evaluation of the implementation of the EBGs for VAP prevention by considering the local context. [8]

Age wise distribution of sample reveals that majority 74% within the age group of 22-25 years and 26% were in the age group of 26-30 years. Gender distribution of sample reveals that about 68% were female. While 32% were male. The percentage distribution of patients in educational qualification shows that among 54% were B.B.sc. and 44% were RGNM. The year of work experience was 96% between 1-5 years and 4% between 6-10 years, respectively. Ventilator Associated Pneumonia represents a major health problem because of the excess mortality and morbidity rate in hospital and also this infection

will aggravate the underlying disease process and worsening the condition of the patient. VAP is medical condition that results from infection which floods the alveoli - small, air-filled sacs in the lung responsible absorbing oxygen from atmosphere. [9] Pneumonia has accounted for approximately 15% of all hospital-associated infections and 24% - 27% of all infections acquired in the medical intensive care unit, and coronary care unit, respectively. It has been the second most common hospital associated infection after that of urinary tract. [10]

Most of the samples 29 (58%) were having average knowledge, 12 (22%) were having poor knowledge and 9 (18%) were having good knowledge regarding VAP. Most of the samples 47 (94%) were having good knowledge, 3 (6%) were having average knowledge regarding VAP. The pretest and post-test knowledge score among staff nurses the pretest mean score was 11.519 with SD 2.648 and post-test mean score was 16.634 and SD 2.528 and the mean difference was 6.114 and calculated t value was 17.713 which was statistically significant at level of <0.001. the finding of the present study supported the study conducted by Amina I. Badawy on Effect of a structured teaching program for prevention of ventilator-associated pneumonia on knowledge and practices of intensive care nurses at Central Quwesna Hospital, in Egypt. Study shows that nurses were having unsatisfactory total knowledge and practice at the pre-program implementation, however, the score of total knowledge increased immediately after the program, and continued to be higher at the first follow-up phase, (statistically significant, $p < 0.001$) indicating that the nurses gained knowledge after implementation of teaching program. [11]

Korhan et al [12] evaluated a multiple-choice questionnaire to assess nurses' knowledge of infection prevention measures. Jansson et al [13,14] conducted a survey on critical care nurses in Finland and showed similar findings of more experienced nurses performing significantly better than their less experienced colleagues. Perez-Granda et al [15] administered a 20-point questionnaire for evaluation of knowledge of health care workers in a Spanish ICU. They deduced that a simple, easy-to-complete questionnaire helped to promptly evaluate personnel. The findings of the study also supported the study conducted by Chithra R.A Janula Raju with the title of Effectiveness, structured teaching programme, Knowledge, prevention ventilator associated pneumonia, critical care nurses that there was a marked increase in the overall knowledge score of post-test than pre-test score which represents the effectiveness of structured teaching programme. The calculated t test value was found to be 5.934 which are highly significant at 0.01. Thus the structured teaching programme was effective in improving the knowledge of critical care nurses regarding prevention of ventilator associated pneumonia. [16]

Conclusion

The current study showed that the nurses had satisfactory total knowledge at the pre-program implementation, indicating that the respondents lacked knowledge. However, the score of total knowledge increased immediately after the planned teaching program, indicating that the nurses gained knowledge after the teaching program.

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