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RESEARCH ARTICLE

KNOWLEDGE AND PRACTICE ON VENTILATOR ASSOCIATED PNEUMONIA (VAP) CARE BUNDLE OF MECHANICALLY VENTILATED PATIENT AMONG STAFF NURSES WORKING IN THE INTENSIVE CARE UNIT OF TERTIARY CARE HOSPITALS OF SIKKIM

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ABSTRACT

Introduction: Ventilator-associated pneumonia is a lung infection that develops in a person who is on a ventilator. A ventilator is a machine that provides oxygen to a patient via a tube inserted in the patient's mouth or nose, or through a hole in the front of the neck. If microorganisms reach the patient's lungs through the tube, an illness may result. When a patient is critically ill, or during and after surgery, he or she may require a ventilator. Ventilators can save a patient's life, but they also raise the risk of pneumonia by making it easier for germs to enter the patient's lungs. The purpose of this study is to evaluate the knowledge and practise of ICU nurses. ***Method:*** A descriptive study was conducted in ICUs of CRH and New STNM hospital, Gangtok, Sikkim. The sample consisted of 66 staff nurses, who fulfilled inclusion criteria of the study. Non probability purposive sampling technique was used. The data collection tool used for the study was 20 structured knowledge questionnaires on VAP Bundle and 20 practice observational checklist. ***Result:*** Out of 66 ICU staff nurse 89.4% had a good knowledge, 7.6% had average knowledge and 3% of the staff nurses had poor knowledge on VAP bundle care. Majority 98.48% had good knowledge regarding VAP treatment, 39.39% had poor knowledge on VAP bundle care components. 69.7% of the staff nurses had good practice, 23.3% had average practice and 3% had poor practice. 100% of the staff nurses wore PPE for protection of the airway and 42.42% of staff nurses did not practice standard hand washing technique appropriately. The present study revealed that there was moderately positive correlation between knowledge and practice of VAP bundle care (r= 0.148). There was no association between nurse knowledge score with the demographic variables, also there was no association between practice score with demographic variables. ***Conclusion:*** The study found that the majority of the ICU nurses had good knowledge and practice on VAP prevention, there is still need for continuous training on evidenced based practices so as to prevent infection and complication.

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INTRODUCTION

Ventilator-associated pneumonia is a lung infection that develops in a person who is on a ventilator. A ventilator is a machine that is used to help a patient breathe by giving oxygen through a tube placed in a patient's mouth or nose, or through a hole in the front of the neck. An infection may occur if germs enter through the tube and get into the patient's lungs. A patient may need a ventilator when he or she is very ill or during and after surgery. Ventilators can be life-saving, but they can also increase a patient's chance of getting pneumonia by making it easier for germs to get into the patient's lungs. [1] Hospital-acquired pneumonia (HAP) is defined by an infection of the lung parenchyma that occurred at least 48 hours after hospital admission. Ventilator-associated pneumonia (VAP) develops in intensive care unit (ICU) patients mechanically ventilated for at least 48 hours.[2] In patients with early VAP (within 96 hours of mechanical ventilation), sputum cultures often grow gram – negative bacteria (e.g., Escherichia coli, Klebsiella, streptococcus pneumoniae, Haemophilus influenzae).

Organism associated with late VAP include antibiotic- resistant organisms such as Pseudomonas aeruginosa and oxacillin- resistant staphylococcus aureus. These organisms are abundant in hospital environment and the patient's GI tract. They can spread in a number of ways, including contaminated respiratory equipment, inadequate hand washing, adverse environmental factors such as poor room ventilation and high traffic flow, and decreased patient's ability to cough and clear secretion. [3] Mechanical ventilation is an essential, life-saving therapy for patients with critical illness and respiratory failure. Studies have estimated that more than 300,000 patients receive mechanical ventilation in the United States each year. These patients are at high risk for complications and poor outcomes, including death. Ventilator-associated pneumonia (VAP), sepsis, acute respiratory distress syndrome (ARDS), pulmonary embolism, barotrauma, and pulmonary edema are among the complications that can occur in patients receiving mechanical ventilation. Such complications can lead to longer duration of mechanical ventilation, longer stays in the ICU and hospital, increased healthcare costs, and increased risk of disability and death.

Mortality in patients with acute lung injury on mechanical ventilation has been estimated to range from 24% in persons 15-19 years of age to 60% for patients 85 years and older [4.] Mechanical ventilation is one of the major supportive modalities in the intensive care unit but it carries a lot of risks and complications, the most common one being VAP. Ventilator associated pneumonia (VAP) is reported to be the most common device-associated nosocomial infection acquired among patients who are mechanically ventilated in the intensive care unit (ICU). While the international nosocomial infection control consortium (INICC) data suggests a VAP incidence as high as 13.6/1000 mechanical (MV) days.

The occurrence of VAP in Asian countries is much higher, and ranges from 3.5 TO 46 Infections/1000MV days. [7] In India a prospective observational study was carried out over a period of 20 months in ICU of a tertiary Care hospital (New Delhi) by Shuvranu Gosh, Amit Damiji, Debasish Dhar et.al. Patients on ventilator more than 48 hours were evaluated for the presence of VAP by CPIS scoring. Endotracheal aspirate or bronchoalveolar lavage samples of suspected cases of VAP were collected from ICU patients and processed as per standard protocols. The result was 84 patients of VAP were identified over the study period. The VAP rates were found to be 6.242/ 1000 ventilator days. Mortality in the VAP patients was 61.84%. Acinetobacter baumannii (37.63%) and Klebsiella pneumoniae (36.55%) was the commonest organism isolated followed by Pseudomonas aeruginosa and Staphylococcus aureus. [5]

MATERIALS AND METHODS

Research approach : Quantitative research approach.

Research Design: Descriptive Survey design.

Setting: The study was conducted in ICUs of central referral hospital and new STNM hospital, Gangtok, East Sikkim.

Population: The population consists of Staff nurse working in ICUs of CRH and NSTNM hospital, Gangtok, East Sikkim.

Sample: The sample consist of 66 staff nurses working in ICUs of CRH and NSTNM Hospital, Gangtok, Sikkim.

Sample size: Total enumeration of nursing staff working in intensive care unit of tertiary hospitals of Sikkim.

Sampling technique: Non - Probability sampling technique.

Sampling criteria

Inclusion Criteria

Staff nurses who are:

- Working in ICU
- Willing to participate in the study
- Present during the time of data collection

Exclusion Criteria

Staff nurses who are

- Who are working in general wards.
- Assistant nursing superintendent (ANS) and Deputy nursing superintendent (DNS)

Data collection tools and techniques: Based on the objectives of the study the following tools were selected

Tools for data collection

Tool 1: Socio - Demographic proforma

Tool 2: A: Structured Knowledge questionnaire
Tool 2: B: Observational checklist for practice

Development and description of tool: The tool was prepared on the basis of the study to assess the Knowledge and Practice on Ventilator Associated Pneumonia (VAP) Care Bundle of Mechanically Ventilated Patient among Staff Nurses working in the Intensive Care Unit of Tertiary care Hospitals of Sikkim

Validity of the tool: The validity of the tool was established by a panel of 7 experts, selected based on their expertise and experience in the particular fields.

Reliability of the tool: The reliability of Tool 1 Demographic proforma was calculated by intra-rater reliability where. The reliability of Tool 2 section A and B i.e., knowledge questionnaire and practice observational checklist was checked with the help of split-half method.

Data collection procedure: Data were collected 66staff nurses working in ICUs of CRH and New STNM Hospital, Gangtok, Sikkimafter getting administrative approval from the Principal, Sikkim Manipal College of Nursing to conduct the study. Formal permission from Medical Superintendent of Central Referral Hospital and New STNM were taken. The purpose of the study was explained to the entire subject and written consent was obtained from all the samples. Data was collected by using self-reports for structure knowledge questionnaire and observation checklist for practiceon Ventilator Associated Pneumonia (VAP) Care Bundle.

Plans for data analysis: The data was planned to be analyzed by using descriptive and inferential statistics.

RESULTS

The data were organized under the following headings. Table2. illustrates that correlation was tested by using Pearson correlation revealed that (r=0.148) indicate moderately positive correlation between knowledge and practice of ventilator associated pneumonia (VAP) care bundle of mechanically ventilated patient among staff nurses working in intensive care unit and (p=0.704) was statistically non-significant at $p<0.05$ level of significance.

DISCUSSION

The findings of the study are discussed with reference to objectives and the findings of the previous studies. In the present study majority 89.4%hadgood knowledge, 7.3%had average knowledge and 3% had poor knowledge. This study is supported by a study conducted by Dipali U Dumb reinterpreted that out of 60 nurses more than half (56.7%) of the staff nurses had excellent knowledge regarding ventilator care bundle and 43.3% of them had good knowledge regarding ventilator care bundle. In the present study majority 69.7%had good practice, 27.3%had average practice and 3% had poor practice.

This study is consisted by a study conducted by Dipali U Dumbre study on assessment of Knowledge and Compliance of Critical Care Nurses Regarding Ventilator Care Bundle in Prevention of Ventilator Associated Pneumonia revealed that majority (71.7%) of the staff nurses had good compliance regarding ventilator care bundle, 18.3% of them had satisfactory compliance and 10% of them had excellent compliance regarding ventilator care bundle. In the present study(r=0.148) indicate moderately positive correlation between knowledge and practice of ventilator associated pneumonia (VAP) care bundle of mechanically ventilated patient among staff nurses working in intensive care unit. This study is supported by Chaltung Khishung conducted study on assessment of knowledge and compliance of critical care nurses regarding ventilator associated pneumonia care bundle in a tertiary care hospital, Assam, India. It was revealed that there was a weak positive correlation (0.39) between the knowledge and compliance scores.

Table 1: Frequency and percentage distribution of demographic variables

N=66

Demographic variables	Characteristics	frequency	percentage
Age in years	23-28 years	44	66.7
	29-34 years	17	25.8
	35-40 years	4	6.1
	≥41 years	1	1.5
Religion	Buddhist	25	37.9
	Christian	6	9.1
	Hindu	35	53
	Muslim	0	0
Educational qualification	Post graduate	5	7.6
	Graduate	36	54.5
	General nursing and midwifery	25	37.9
Type of intensive care unit	Neuro ICU	9	13.6
	Cardiac ICU	10	15.2
	Trauma ICU	0	0
	Central ICU	16	24.2
	MICU	14	21.2
	SICU	17	25.8
Intensive care unit Experience	6 months	9	13.6
	1-2 years	17	25.8
	3-4 years	21	31.8
	>4 years	19	28.8
Any ICU Training attended	Yes	25	37.9
	No	41	62.1

Table 2. Correlation between knowledge and practice of ventilator associated pneumonia (VAP) care bundle of mechanically ventilated patient among staff nurses working in intensive care unit

N=66

Correlation	Mean	SD	r value	p value
Knowledge	16.73	2.229		
Practice	15.52	2.644	0.148	0.704^{NS}

*p<0.05 level of significance

Table 3. Association between knowledge of ventilator associated pneumonia (VAP) care bundle of mechanically ventilated patient among staff nurses workingin intensive care unitwith selected demographic variables

N=66

Demographic variables	Characteristics	Knowledge			χ2 value	df	p value
		Poor	Average	Good			
Age in years	23-28 years	1	4	39	11.02	6	0.088^{NS}
	29-34 years	0	0	17			
	35-40 years	1	1	2			
	≥41 years	0	0	1			
Religion	Buddhist	1	3	21	1.697	4	0.791^{NS}
	Christian	0	0	6			
	Hindu	1	2	32			
	Muslim	--	--	--			
Educational qualification	Post graduate	0	1	4	4.501	4	0.342^{NS}
	Graduate	2	1	33			
	General nursing and midwifery	0	3	22			
Type of intensive care unit	Neuro ICU	1	2	6	11.53	8	0.173^{NS}
	Cardiac ICU	0	2	8			
	Trauma ICU	--	--	--			
	Central ICU	0	0	16			
	MICU	0	0	14			
	SICU	1	1	15			
Intensive care unit Experience	6 months	0	3	6	12.13	6	0.059^{NS}
	1-2 years	1	1	15			
	3-4 years	0	0	21			
	>4 years	1	1	17			
Any ICU Training attended	Yes	0	1	24	2.095	2	0.351^{NS}
	No	2	4	35			

*p<0.05 level of significance NS-Non significant

Table 4: Association between practice of ventilator associated pneumonia (VAP) care bundle of mechanically ventilated patient among staff nurses workingin intensive care unitwith selected demographic variables

N=66

Demographic variables	Characteristics	Practice			χ2 value	df	p value
		Poor	Average	Good			
Age in years	23-28 years	0	12	32	6.568	6	0.363^{NS}
	29-34 years	2	5	10			
	35-40 years	0	1	3			
	≥41 years	0	0	1			
Religion	Buddhist	1	5	19	1.280	4	0.865^{NS}
	Christian	0	2	4			
	Hindu	1	11	23			
	Muslim	--	--	--			
Educational qualification	Post graduate	0	0	5	5.566	4	0.234^{NS}
	Graduate	0	11	25			
	General nursing and midwifery	2	7	16			
Type of intensive care unit	Neuro ICU	0	1	8	7.556	8	0.478^{NS}
	Cardiac ICU	0	3	7			
	Trauma ICU	--	--	--			
	Central ICU	0	5	11			
	MICU	0	4	10			
	SICU	2	5	10			
Intensive care unit Experience	6 months	0	0	9	10.38	6	0.110^{NS}
	1-2 years	0	4	13			
	3-4 years	0	8	13			
	>4 years	2	6	11			
Any ICU Training attended	Yes	2	6	17	3.455	2	0.178^{NS}
	No	0	12	29			

*p<0.05 level of significance NS-Non significant

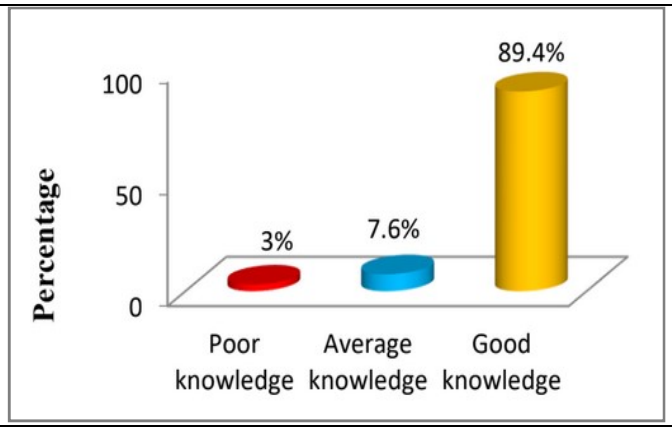

Fig. 1. Knowledge of ventilator associated pneumonia (VAP) care bundle of mechanically ventilated patient among staff nurses working in intensive care unit

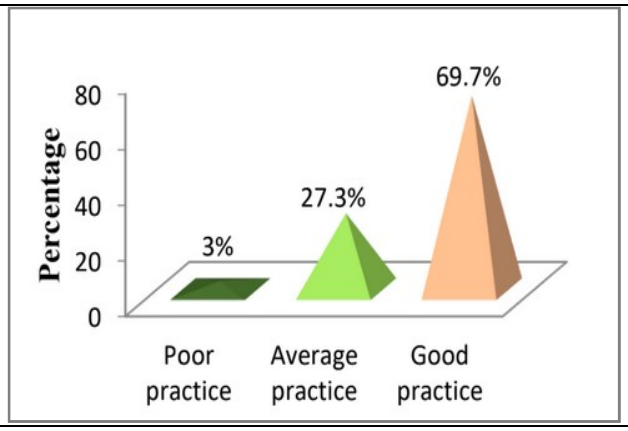

Fig. 2. Practice of ventilator associated pneumonia (VAP) care bundle of mechanically ventilated patient among staff nurses working in intensive care unit

CONCLUSION

The study was conducted to assess the knowledge and practice of ICU staff nurses regarding VAP bundle care in tertiary care hospitals of Gangtok, Sikkim. The present study showed that there is good knowledge and practice on VAP bundle care ,there is still need of continuous training on VAP prevention since nurses are taking care of the patient 24hours a day. It is crucial for them to update the knowledge and be compliance to evidenced based practices.

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