Description of Implementation of Ventilator Bundle (VB) at ICU of Mangusada District Hospital

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Abstract:

The ventilator is a breathing apparatus that functions to maintain oxygen delivery for a long time. One of the impacts caused by using a ventilator for a long time is a nosocomial infection called Ventilator Associated Pneumonia (VAP). The purpose of the research was to explore the implementation of ventilator bundles by nurses in the ICU. Research is a quantitative descriptive study using a cross-sectional research design. The population in this study amounted to 30 with a non-probability type sample, and researchers will use a total sampling technique. There were 17 women (56.7%) who had washed their hands, in the ICU training characteristics there were 14 people (46.7%) who did not have ICU training who had done hand washing and there were 15 people (50%) nurses with D3 nursing education who had done washing hands. There were 18 people (60%) of the female sex who had taken oral hygiene measures. In the ICU training characteristics, there were 15 people (50%) who did not have ICU training who had carried out oral hygiene. In the characteristics of the education level, there were 17 people (56.7%) with an education level of diploma nursing have already performed oral hygiene. VAP Bundles are a set of evidence-based practices (EBP) that result in VAP improvements when carried out collectively and consistently by health workers, namely nurses and doctors who are responsible for patients on mechanical ventilators.

INTRODUCTION

The ventilator is a positive or negative pressure breathing apparatus that produces controlled airflow in the patient's airway to maintain and improve ventilation and oxygen administration in the long term. Patients who are intubated, using a ventilator, and for a long time in the ICU will be at risk of developing a nosocomial infection called Ventilator Associated Pneumonia (VAP) (Susanti et al., 2015). VAP is pneumonia caused by a nosocomial infection after 48-72 hours of intubation and installing a mechanical ventilator from either an endotracheal tube or a tracheostomy tube.

Patients diagnosed with VAP will experience physical complaints such as increased body temperature (fever), increased heart rate (tachycardia), increased or decreased white blood cell counts (leukocytosis), changes in the consistency and color of sputum (sputum), and marked inflammation or infection of the lungs. with infiltrates on chest X-ray in the lung fields (Solikin, et al., 2020).

The incidence of VAP in hospitals, especially in the ICU, can be minimized with an action procedure, namely the VAP Bundle (VAPb). VAPb is published by The Institute for Healthcare Improvement (IHI) and has been stated to be able to reduce the incidence of VAP when properly

implemented in all patients who are attached to a ventilator. The results of the application at the Albany Hospital in New York City show that since the nurses comply and are able to apply VAPb, the incidence of VAP drops to 0 events (Futaci & Arifin, 2014). Solikin et al., (2020) also researched the implementation of VAPb in the ICU. They showed a reduction in VAP incidence in patients attached to a ventilator, from 71,400 cases to 46,100 cases. VAPb issued by Ashmore (2008) consists of five series of VAP prevention, namely elevation of the head or head of bed (HOB), namely the position of the patient's head as high as 30°-50° at all times unless there are contraindications, oral care by maintaining oral hygiene every 2-4 hours (oral hygiene), thromboembolic prophylactic therapy, peptic ulcer prophylactic therapy, daily evaluation of sedation and readiness for extubation. Government hospital ICUs use VAPb referrals from the RI Minister of Health No. 27 of 2017, adopted by the Center for Disease Control (CDC). The five VAPb elements used are hand hygiene which includes washing the hands of health workers to prevent the chain of germ contamination to patients. Hand washing is an effort to break the chain of transmission of contamination from nurses to patients or vice versa. Non-standard hand washing is a risk factor for VAP in patients.

Various studies on preventing nosocomial infections have been carried out, as well as research on preventing VAP. One of the preventive measures published by The Institute for Healthcare Improvement (IHI) is creating the Ventilator Bundle, a series of evidence-based interventions, if implemented together for all patients with mechanical ventilation, will result in a drastic reduction in the incidence of VAP. Bundle ventilators have been widely applied in various hospitals. In a hospital in Boston, after increasing adherence to use from 53% to 91%, the incidence of ventilator-associated decreased from an average of 10.2/1000 to 3.4/1000 (Tolentino DelosReyes et al., 2017).

According to Kartika (2019), age is one of the factors that can affect nurses in carrying out the care of patients who are installed with mechanical ventilators that cannot be maximized. The data shows that higher education does not guarantee that VAP prevention will be good. The thoroughness and accuracy still needs to be improved in carrying out nursing actions for nurses with an undergraduate education, while education that is still DIII may be due to a lack of experience regarding VAP prevention. Remember, the excessive workload marked by the high number of patients can also be one of the causes of poor VAP prevention by nurses with undergraduate education.

Based on a preliminary study conducted in May 2022, there were 23 patients with mechanical ventilators out of 30. In June, there were 18 patients with mechanical ventilators out of 23 total patients for a month, and in July 2022, there were 20 patients with mechanical ventilators out of 29 patients. Based on the latest situation in the ICU room, an additional 12 nursing staff were obtained. This requires further attention regarding the application of the ventilator bundle—the research aimed to explore the implementation of ventilator bundles by nurses in the ICU.

METHOD

This research is a type of research conducted by this research, namely a quantitative descriptive study. A descriptive study is research that objectively explains phenomena, situations, individual characteristics, or specific groups using a cross-sectional research design. The purpose of descriptive research is to describe the important events that occurred.

This research intends to describe the Ventilator Bundle (VB) application in the ICU Room of Mangusada Hospital. This research was conducted in the ICU room of the Badung Mangusada Hospital from 30 October - 30 November 2022. Data were collected in two ways. First, using a

questionnaire, and second, observing nurses' implementation while performing every aspect of ventilator bundles.

In this study, the samples were ICU nurses at Mangusada Hospital. The sample in this study was 30 ICU nurses. Sample selection by specifying subjects who meet the research criteria is included in the study for a certain period to fulfill the number of respondents. The sampling technique is non-probability, and the researcher uses a total sampling technique.

RESULT

Univariate Analysis

Table 1. Characteristics of Respondents (n=30)

Variable	Frequency (f)	Percentage (%)
Age (years old)		
Mean ± SD (min-max) = 36.8 ± 6.19 (29–49)		
Education		
Diploma	17	56.7
Bachelor	13	43.3
Gender		
Male	11	36.7
Female	19	63.3
ICU Training		
Yes	14	46.7
No	16	53.3

Table 1. show that the average age of nurses in the ICU room is 36.8, with a standard deviation of 6.19. The lowest age is 29 years, and the highest is 49 years. In this study, there were 19 female nurses (63.3%) more than male nurses. For education data, the education of Diploma 3 Nursing nurses is 17 (56.7%) more than that of Nurse Professional nurses. In the characteristics of intensive care training, it was seen that 16 people (53.3%) of ICU nurses had done ICU training.

Overview of Ventilator Application Bundles

Table 2. Overview of Ventilator Application Bundles (n=30)

Variable	Frequency (f)	Percentage (%)
Handwashing Application		
Yes	27	90
No	3	10
Patient Positioning (Semi fowler)		
Yes	30	100
No	0	0
Oral Hygiene		
Yes	29	96.7
No	1	3.3
Suctioning/Airway Clearance		
Yes	30	100
No	0	0
Sedation Assessment		
Yes	30	100
No	0	0

Based on the table above, 27 people have done hand washing in applying the ventilator bundle, and three have not washed their hands; 90% of nurses have washed their hands. Judging from the gender characteristics, ICU training, and education level, the semi-fowler position was applied with a percentage of 100%. As many as 29 people have performed oral hygiene in implementing the Ventilator Bundle. Only one person did not carry out oral hygiene in implementing the Ventilator Bundle. It can be concluded that the implementation of oropharyngeal and tracheal secretions in the application of the ventilator bundle in the ICU room at Mangusada Hospital was carried out well, as seen from the achievement of 100% implementation of oropharyngeal and tracheal secretions in the application of the ventilator bundle. The implementation of the Secretion Assessment of Sedation in the Application of the Ventilator Bundle in the ICU Room of Mangusada Hospital was carried out well, as seen from the 100% achievement of the implementation of the Sedation Assessment in the Application of the Bundle Ventilator.

DISCUSSION

Based on the study's results, 17 women (56.7%) carried out handwashing activities. In the ICU training characteristics, 14 people (46.7%) did not have ICU training to do hand washing in applying the ventilator bundle. There were 15 nurses (50%) with education D3 in nursing performing hand washing using the ventilator bundle. 90% of nurses have washed their hands. This study's results differ from the research conducted by Sari et al. (2019), which obtained the results from research observations. In 33 respondents, it was found that 100% of nurses washed their hands with running water and anti-septic.

Healthcare workers can contaminate their hands after contact with patients and the patient environment. Following the DEAC study (2019), hand hygiene can reduce infection, which is very effective for infection prevention and control. Proper hand hygiene practices have been shown to reduce healthcare-related infections. Hand washing is carried out after contact with the patient, the environment around the patient, patient fluids, and before and after invasive procedures.

The researcher assumes that there are still nurses who do not wash their hands (10%) because there are components of the five hand washing moments in this study's observations that still need to be carried out. The evaluation of hand washing must do the five moments of hand washing. It is said that they have washed their hands in the application of the ventilator bundle sample, they have to wash their hands at five moments of hand washing, so it can be seen that some nurses do not wash their hands at five moments, namely before carrying out aseptic procedures and after contact with the patient's environment.

The results showed that the application of giving the semi fowler position was carried out with a percentage of 100%; the results of this study followed research conducted by Bakhtiari et al. (2015), who said the incidence of VAP was significantly reduced in the intervention group raising the head of the bed around 45°, drainage of subglottic secretions, oral hygiene using 2% chlorhexidine. Following the results of a study by Najafi et al. (2016), the incidence of VAP was significantly lower in patients who were given the intervention by lifting the head of the bed 45° instead of 30°.

The results showed that there were 18 people (60%) female performing oral hygiene actions, and in the ICU training characteristics, there were 15 people (50%) who did not have ICU training taking oral hygiene actions and; on the features of the level of education, as many as 17 people (56.7%) with a D3 nursing education level took oral hygiene measures, 96.7% of the nurses in the ICU Mangusada Hospital had performed oral hygiene in the application of the ventilator bundle.

Oral hygiene treatment is the right action to prevent the occurrence of VAP. Oral hygiene is an independent nursing action that has a major impact on the success of VAP prevention in patients on mechanical ventilators. In patients in the ICU, dental plaque forms faster than in other patients (Kaya et al., 2017).

Estaji et al. (2016) said toothbrushing is necessary in implementing oral care in intubated patients. Tooth brushing is done on the teeth, gums, palate, and tongue. However, it must be done carefully so as not to cause dislocation of the ETT tube and bleeding. The Critical American Nurses Association and Center for Disease Control and Prevention recommend oral hygiene using chlorhexidine gluconate (0.12%) in oral care and brushing the patient's teeth for 3 to 4 minutes to reduce the risk of VAP (Tolentino et al., 2017).

The results of this study obtained 100% results of implementing oropharyngeal and tracheal secretions in the application of a ventilator bundle; the results of this study following research conducted by Sari et al. (2019) where nurses perform mucus suction if needed, aseptic procedures and use complete PPE in 33 respondents with a percentage of 100%. This proves that the adherence to aseptic techniques during ETT suctioning, which is the cause of infection in the intensive care unit, is known by nurses in intensive care. This follows Sadli's research (2017).

In this study, the Sedation and Extubation assessment implementation reached 100% in the application of the ventilator bundle. This is different from the research conducted by Sari et al., (2019), the results of observations obtained data that out of 33 respondents the scores for implementing the VAPb assessment every day of sedation and extubation with a maximum implementation percentage of 75%, and not a maximum of 25%. This is because the use and documentation of thrombus prevention therapy in the form of medicaments in patients on ventilators are still based on disease diagnosis, side effects, and previous medical history (doctor's instructions). So that for documentation of nursing, the use of medicaments has yet to be carried out. However, documentation of nursing actions preventing thrombus in patients (non-medicaments) is still being carried out in the integrated patient development record (CPPT).

CONCLUSION

The implementation of hand washing in the application of the ventilator bundle is 90%. The application of giving the semi-fowler position is carried out with a percentage of 100%— examination of oral hygiene / oral hygiene. 96.7% of ICU nurses at Mangusada Hospital. The implementation of oropharyngeal and tracheal secretions in the application of ventilator bundles in the ICU at Mangusada Hospital was carried out well, as seen from the achievement of 100% implementation of oropharyngeal and tracheal secretions in the application of ventilator bundles. There is 100% implementation of sedation and extubation studies in the application of ventilator bundles in the ICU Room of Mangusada Hospital. The high workload in the ICU requires the creation of a Ventilator bundle checklist tool to reduce the possibility of incomplete comprehensive nursing documentation in the use of a ventilator bundle to reduce the incidence of VAP.

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