Impact of education on ventilator-associated pneumonia in intensive care unit

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INTRODUCTION Ventilator-associated pneumonia (VAP) is a common risk among critically ill ventilated patients. This study aimed to investigate the effects of nurse-led education on: (a) knowledge of and compliance with ventilator care bundle (VCB) practices among intensive care unit (ICU) nurses; and (b) reduction in the rates of VAP post intervention.

METHODS A quasi-experimental design with pretest-posttest evaluation and observation was used to investigate nurses’ practices and the incidence of VAP. The study was conducted among 71 nurses, and the intervention involved structured education on VAP and its prevention using VCB in an ICU setting. Data were analysed using descriptive and inferential statistics.

RESULTS Nurse-led education significantly increased nurses’ knowledge of (t[70] = −36.19; p < 0.001) and compliance with (t[65] = −21.41; p < 0.001) VCB practices. The incidence of VAP, which was 39 per 1,000 ventilator days during the two-month period before intervention, dropped to 15 per 1,000 ventilator days during the two-month period following intervention.

CONCLUSION Our findings show that nurse-led education on VAP and VCB significantly increased knowledge of and compliance with VCB practices among ICU nurses, and was associated with a reduction in the incidence of VAP among intubated and mechanically ventilated ICU patients. Inclusion of recent knowledge and evidence-based VCB guidelines for VAP prevention when educating anaesthetists, nurses, physiotherapists and other healthcare providers in the critical care setting is recommended.

Keywords: compliance, intensive care, knowledge, ventilator-associated pneumonia, ventilator care bundle

INTRODUCTION

Ventilator-associated pneumonia (VAP) is a nosocomial airway infection of the lung parenchyma that develops more than 48–72 hours after a patient is intubated and mechanical ventilation is initiated. VAP is the leading cause of death among critically ill patients, with its associated mortality rate exceeding that of other nosocomial infections such as central line catheter infection, sepsis and respiratory infections. VAP has been identified as a major safety issue among critically ill patients receiving mechanical ventilation. Several studies have highlighted VAP as one of the most common healthcare-associated infections among critically ill patients on mechanical ventilation support. The main contributing factor of VAP is microaspiration of oropharyngeal organisms from around the endotracheal tube’s cuff into the distal bronchi, which is followed by proliferation of bacteria and its invasion of lung parenchyma. Prevention of VAP is thus of utmost importance in critical care. Steps to reduce the incidence of VAP have been identified based on clinical best practice guidelines worldwide. These guidelines promulgated the ventilator care bundle (VCB) as an evidence-based guideline for the prevention of VAP. According to the Institute for Healthcare Improvement (IHI) United States of America, the VCB is a series of small, straightforward sets of practices or interventions related to ventilator care that, when implemented together, would achieve significantly better outcomes than when implemented individually. The VCB has four key components: (a) elevation of the head of the bed; (b) daily sedation hold; (c) gastric ulcer prophylaxis; and (d) deep vein thrombosis prophylaxis.

The unit that the intensive care unit (ICU) nurses in our study belong to did not enforce any structured VCB guidelines prior to the study. In view of the absence of VCB guidelines, we were of the opinion that there is significant value in educating critical care nurses in such units. This study aimed to compare the effects of nurse-led education on VCB on the incidence of VAP among ventilated patients in a critical care setting. The central query that the study set out to answer was this: what would the effects of implementing a nurse-led education programme on VCB be on the enhancement of the knowledge and compliance of nurses in an ICU?

METHODS

A quasi-experimental study using a pretest-posttest design was conducted in an ICU of a large teaching hospital in Malaysia. Convenience sampling was used. All 71 nurses from the ICU were included in the study, as the general rule of thumb in the determination of sample size is to select as large a sample as possible from the target population to minimise the occurrence of sample size error.