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Evaluation of a continuous quality improvement program using bundle approach to improve ventilator care process in an intensive care unit

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Introduction

Prevention of ventilator-associated pneumonia (VAP) is a priority safety issues in intensive care unit (ICU) as VAP is a common cause of nosocomial infection acquired by patients requiring mechanical ventilation. The impact of a continuous quality improvement (CQI) program integrating ventilator bundle was investigated.

Objectives

To examine the effect of a CQI program using an expanded ventilator bundle on VAP rate, duration of mechanical ventilation, ICU average length of stay, critical care nurses' knowledge of ventilator bundle and VAP, and adherence to the care bundle.

Methodology

A prospective pretest-posttest study was conducted in a 13-bed adult medical/surgical ICU. Subjects were patients supported by ventilators and nurses working in the studied ICU. The CQI program consisted of the protocol development and education sessions to nurses. The ventilator care bundle protocol incorporated six clinical maneuvers (head of bed elevation, deep vein thrombosis (DVT) prophylaxis, gastric ulceration prophylaxis, sedation evaluation, oral care protocol and strict hand hygiene policy) and educational campaign included lectures and board display. VAP rate, duration of mechanical ventilation and ICU length of stay were examined before and after the CQI program. A questionnaire was used to evaluate change of nurses' knowledge while direct observation and records review were conducted to assess adherence of practice before and after the CQI program.

Result

Nurses obtained significantly higher in percentage of correct answer 5 out of 10 questions (p from 0.00 to 0.02) after the CQI program. There were also a significant

increase of nurses' adherence with head of bed elevation (24% versus 76%, $p=0.02$), DVT prophylaxis (64% versus 96%, $p=0.01$); and hand hygiene before patient contact (0% versus 50%, $p=0.00$). However, only a statistical insignificant reduction of VAP rate (7.14 versus 6.25 episodes/1000 ventilation days, $p=0.26$), duration of mechanical ventilation (3.61 versus 3.04 day, $p=0.11$) and ICU length of stay (5.6 vs 5.4 days, $p=0.63$) were observed. The program was effective in improving nurses' knowledge and consistency in bundle care application.