Abstract

It has been proposed that by initiating the highest percentages of nursing compliance, overall patient outcomes will improve along with a decrease in the number of ventilator-associated events (VAEs). The aim of the study is to appraise the association between nursing compliance with a ventilator bundle and a successful decline in the number of events of ventilator-associated pneumonia (VAP) in the intensive care unit (ICU). The study also provides evidence-based direction on the best nursing practices essential to reducing the rates of VAP. Objectives include expanding the awareness of critical care staff on prevention and compliance and to improve teamwork and collaborative efforts among the healthcare team. This creates conditions promising to patients beginning with the delivery of safe and effective nursing care.

Introduction

- In a recent study conducted by Othman and Abdelzazim (2017), it was found that VAP occurs in 28% of mechanically ventilated patients, where the numbers vary according to the duration of ventilation (p.61).

- "The IHI Ventilator Bundle – a grouping of best practices that, when applied together, may result in substantially greater improvement – has been implemented in many ICUs, along with teamwork and communication strategies" (Institute of Healthcare Improvement, 2018a, para. 2).

- "Conducting research on compliance with VAP prevention measures in ICU patients can be beneficial in identifying shortcomings and resolving them, improving the level of care, and reducing medical and treatment costs" (Tabaeian, Yazadannik, & Abbasi, 2017, para. 4).

Theoretical Framework

The Health Belief Model (HBM) aims at explaining individual health behaviors based on attitudes and beliefs and providing a framework for preventative health care practices. The HBM proposes that a person's health-related behaviors are based on the desire to avoid illness or get well and the belief that a specific action will prevent or improve illness (Strecher & Rosenstock, 1997, p. 113). The perceived susceptibility and severity of nurses is deficient as hand hygiene and compliance with the ventilator bundle is not at an optimal level, despite the perceived benefits. A framework using HBM can be used to guide educational sessions and provide opportunities to healthcare personnel in identifying benefits and barriers to reducing VAP rates through the use of a ventilator bundle. It can be concluded that the Health Belief Model (HBM) fixated on prevention was used as a reference framework throughout this study. An increase in motivation and compliance with the bundled approach can be due to proper knowledge and efficacy of interventions among nurses.

Article 1

- A quasi-experimental study was perform by Eom et al (2014) using a reconstructed VAP bundle. Education of the ICU team, including nurses and doctors, on the importance of the bundle and need to comply, was performed and a checklist was used for compliance (p. 35).

- Overall compliance with the bundle showed improvement, from 41.1% to 71.8% with a reduction in VAP rates from 4.08 to 1.16 events per 1,000 ventilator days

- Initially, oral chlorhexidine was lacking the most at 45.6%, but made the most impact at 91.6%

Article 2

- Ismal and Zahran (2015) examined the role of the critical care nurse in preventing VAP.

- A training session on VAP prevention was conducted and nursing knowledge and practices were evaluated before and after the training through demonstration (p. 44).

- Knowledge on head of bed elevation improved from 79.2% to 100% while knowledge on daily sedation vacation and daily assessment for readiness to wean only increased from 62.5% to 78.5% (p. 45).

- Only half of the nurses used clean gloves during suctioning and pre-intervention results showed 58.5% compliance with hang hygiene

- It was found that only 41.7% of nurses were aware of the definition of VAP before the training

Article 3

- Salama et al (2013) conducted a study to measure compliance with hand hygiene before and after the implementation of an education program for healthcare personnel.

- A direct observation method of compliance (p. 29), also known as the 'gold standard' for measuring compliance with hand hygiene policies, was utilized (p. 32).

- Prior to the implementation strategies, only 50% of nurses were compliant with hand hygiene. What about after the educational program?

- Hand hygiene among doctors and other healthcare personnel was poor

IHI Improvement Map

(1) Elevation of the head of bed at 30-45 degrees

(2) Daily sedation vacation and assessment for readiness to extubate

(3) PUD prophylaxis

(4) DVT prophylaxis

(5) Oral care with chlorhexidine

Recommendation

- IHI Ventilator Bundle with oral decontamination using tooth-brushing and/or routine oral care with chlorhexidine (Fernanda de Lacerda Vidal, 2017; Chacko et al., 2016) in addition to best hand hygiene practices to improve compliance (Rello et al., 2013; Su et al., 2017; Salama et al., 2013).

- I am recommending the use of a hospital-based education and training program, also known as an Infection Control Program, routine audits to monitor compliance in the form of a checklist, daily rounds, and staff feedback to improve quality of care and enhance compliance strategies with VAP preventative strategies (Center for Disease Control and Prevention, 2016, p. 4).

- A tool known as the "Infection Prevention and Control Assessment Tool" will be used to evaluate the program.

- Direct observation is used as the 'gold standard' for evaluating nursing compliance with the hand hygiene protocol (Salama et al., 2013, p. 32)

Why?

A tool appraising nursing reliability and validity is essential to precisely evaluate nurses' own perception related to practice. In addition, the development of an Infection Control Program through hand hygiene protocols and education will encourage teamwork to improve the quality of care and overall patient health outcomes. The use of evidence-based practice (EBP) is a critical component when developing protocols and procedures that aim at reducing the prevalence of ventilator-associated pneumonia (VAP) in the ICU. Although evidence related to the implementation of a VAP bundle lack consensus among studies, it is evident that inclusive programs are needed to reducing rates of VAP to zero and ensuring a 95% compliance with all elements of the VAP bundle, including hand hygiene.

Conclusion

The application of a ventilator bundle to care is a widely used policy among healthcare facilities in the prevention of ventilator-associated pneumonia (VAP) although there is a lack of uniformity among core measures. This study aimed at evaluating nursing compliance with the bundled approach and its effectiveness on reducing the rates of VAP in critically ill patients.

Multiple studies acknowledged that the risks of developing VAP can be reduced by optimizing nursing knowledge and compliance through the use of education, training, and utilization of a checklist. There is a need for educational programs for nurses on infection control and VAP bundle preventive measures as evidence by low compliance with hand hygiene, oral care protocols, and overall adherence with other criteria of the ventilator bundle prior to the intervention, such as performing a daily interruption of sedation. Although studies revealed a reduction in the events of ventilator-associated pneumonia (VAP) with greater nursing compliance, there is still a need for randomized controlled trials to establish a strong connection between nursing compliance with the ventilator bundle and an improvement in patient outcomes.

References

Al-Thaqafy, M. S., El-Saed, A., Arabi, Y. M., & Balkhy, H. H. (2014). Association of compliance of ventilator bundle with incidence of ventilator-associated pneumonia and ventilator utilization among critical patients over 4 years. *Annals of Thoracic Medicine*, *9*(4), 221–226. http://doi.org/10.4103/1817-1737.140132

Center for Disease Control and Prevention (2016). Infection prevention and control assessment tool for acute care hospitals. Retrieved March 16, 2018 from https://www.cdc.gov/infectioncontrol/pdf/icar/hospital.pdf

de Lacerda Vidal, C. F., de Lacerda Vidal, A. K., de Moura Monteiro, J. G., Cavalcanti, A., da Costa Henriques, A. P., Oliveira, M., ... & Gomes, B. (2017). Impact of oral hygiene involving toothbrushing versus chlorhexidine in the prevention of ventilator-associated pneumonia: a randomized study. *BMC infectious diseases*, *17*(1), 112.

Eom, J. S., Lee, M. S., Chun, H. K., Choi, H. J., Jung, S. Y., Kim, Y. S., ... & Park, S. Y. (2014). The impact of a ventilator bundle on preventing ventilator-associated pneumonia: a multicenter study. *American journal of infection control*, *42*(1), 34-37.

Institute for Healthcare Improvement. (2018a). Ventilator-associated pneumonia. Retrieved March 11, 2018 from http://www.ihi.org/Topics/VAP/Pages/default.aspx

Ismail, R., & Zahran, E. (2015). The effect of nurses training on ventilator-associated pneumonia (VAP) prevention bundle on VAP incidence rate at a critical care unit. *Journal of Nursing Education and Practice*, *5*(12), 42.

Othman, A. A., & Abdelazim, M. S. (2017). Ventilator-associated pneumonia in adult intensive care unit prevalence and complications. *The Egyptian Journal of Critical Care Medicine*, *5*(2), 61-63.

Salama, M. F., Jamal, W. Y., Al Mousa, H., Al-AbdulGhani, K. A., & Rotimi, V. O. (2013). The effect of hand hygiene compliance on hospital-acquired infections in an ICU setting in a Kuwaiti teaching hospital. *Journal of infection and public health*, *6*(1), 27-34.

Strecher @ Rosenstock (1997). Health belief model. *Cambridge Handbook of Psychology, Health, and Medicine.* Retrieved March 25, 2018 from http://assets.cambridge.org/97805218/79972/frontmatter/9780521879972_frontmatter.pdf

Tabaeian, S. M., Yazdannik, A., & Abbasi, S. (2017). Compliance with the Standards for Prevention of Ventilator-Associated Pneumonia by Nurses in the Intensive Care Units. *Iranian Journal of Nursing and Midwifery Research*, *22*(1), 31–36. http://doi.org/10.4103/1735-9066.202073