



SAINT MARY-OF-THE-WOODS COLLEGE

# Reducing Ventilator Associated Pneumonia

Caroline Gadlage, Gwyneth Renfro, Ashley Wells, Erin Young

Department of Nursing, Saint Mary-of-the-Woods College, Saint Mary of the Woods, IN 47876

## Introduction

**Purpose:** Decrease the incidence of ventilator associated pneumonia.

**Problem:** Incident rate- 86% of nosocomial pneumonias are associated with mechanical ventilation. There are 5-10 cases per 1,000 hospital admissions (Koenig et al., n.d., p. 1).

**Mortality rate of 50%** (Koenig et al., n.d, p. 1).



Fig. 1. X-Ray of a patient's lungs with the diagnosis of Pneumonia.

## Materials and Methods

Mechanical Ventilation Policy:

- Elevation of the head of the bed 30-45 degrees
- Prophylaxis for Peptic Ulcer Disease (PUD)
- Prophylaxis for Deep Venous Thrombosis (DVT)
- Oral care done every two hours and as needed
- Chlorhexidine 0.12% mouth rinse every 12 hours for adult patients

## Evidence-Based Practice:

- Saint Mary-of-the-Woods Database
- Google Scholar
- Cumulative Index of Nursing and Allied Health Literature (CINAHL)



Fig. 2. Chlorhexidine Gluconate is a germicidal mouthwash that reduces bacteria in the mouth.



Fig. 3. Kit contains two suction swabs treated with dentifrice (sodium bicarbonate), one 15mL mouth rinse packet, 1 DenTips disposable untreated oral swab and a 3g packet of mouth moisturizer gel. It can be used to clean teeth and gums.

## Results & Discussion

Non-quantitative and semi-quantitative airway sampling of 48 patients. Tracheal cultures and that of lung cultures were not always the same in the incidence of bacteria. This is misleading due to the trachea becoming colonized with bacteria hours after being intubated. Prevention must be key (Koenig et al., n.d.).

Type of bacteria that is causing the infection may be misleading due to the trachea becoming colonized with bacteria hours after being intubated. Prevention is key: Oral care with chlorhexidine, closed suctioning, decreased time of intubation, decreased sedation time (Koenig et al., n.d.).

Simple randomized study of 35 patients per group with an age of 18-65 years. Intervention group received special training in oral care. In the intervention group the patients oral care was based on using Beck Oral Assessment Scale (Atashi et al., 2017).

The incidence of pneumonia in the intervention group was less than that in that control group. However, there was no significant difference. Other interventions played a role in this finding (Atashi et al., 2017).

A 143 ventilated neonates were chosen. The study was given in two phases. The first phase was the ventilator-associated pneumonia was evaluated before implementing the prevention bundle. The second phase was after the implementation of the prevention bundle (Azab et al., 2015).

Implementation of multifaceted infection control bundle resulted in reduction of ventilator-associated pneumonia rate, length of stay in the NICU (Azab et al., 2015).

Sixty-eight patients with endotracheal tube and mechanical ventilation were enrolled in this randomized controlled clinical trial. The study consisted of being over the age of 18, having been under mechanical ventilation for over 48 hours, having had no more than one intubation attempt, no facial or oral trauma, no contraindications to neither mouthwash use not to 30 degrees bed head elevation, no history of HP allergies and no evidence suggesting ventilator associated pneumonia or aspiration (Nobahar et al., 2016).

The findings included that Hydrogen Peroxide did shows signs of lowering the risk of ventilator associated pneumonia. The mouthwash examined the present study has a killing effect on oral anaerobic bacteria and by disinfecting the oral cavity is presents aspiration of secretions contaminated with bacteria into the lower pulmonary tract, thus reducing ventilator associated pneumonia (Nobahar et al., 2016).

Healthcare journal publications in English from 2000 to 2017 that could be found on PubMed, Google Scholar, Science Direct, Medline, Wiley Online Library and Bing (Ostti et al., 2017).

A care bundle came out of the interventions from these journals. It is derived from evidence-based guidelines and are expected to improve patients' health outcomes by facilitating, promoting changes in patient care and encouraging guideline compliance. The nursing role outcome is to better educate the nurses then they will adhere to evidence-based guidelines for preventing ventilator-associated pneumonia (Ostti et al., 2017).

## Conclusions

-Bundle Care approach decreases the incidence of ventilator associated pneumonia (VAP).

- Head of bed elevated 30 degrees
- Oral care every 12 hours with chlorhexidine
- Oral care every 2 hours
- Evaluation daily for extubation
- Decrease sedation daily
- Closed suctioning catheters
- Proton pump inhibitor
- Nurse training

## Future Work

Based off of the literature reviewed and results from the studies, the implementation and evaluation of the VAP bundle will reduce the instances of ventilator associated pneumonia. Further implementation and evaluation can decrease the instances of ventilator associated pneumonia in the clinical setting.

## Literature Cited

- Atashi V., Bekhradi R., Mahjobipoor H., Yazdank A., & Yousefi H. (2017). Effect on oral care program on prevention of ventilator-associated pneumonia in intensive care unit patients: A randomized controlled trial. *Iranian Journal of Nursing and Midwifery Research*, 23, 486-90.
- Azab, S. F., Sherbiny, H. S., Saleh, S. H., Elsaed W. F., Elshafey, M. M., Siam, A. G., Arafa, M. A., Alghobashy, A. A., Bendary, E. A., Basset, M. A., Ismail, S. M., Akeel, N. E., Elsamad, N. A., Mokhtar, W. A., & Gheith, T. (2015). Reducing ventilator-associated pneumonia in neonatal intensive care unit using "VAP Prevention Bundle": A cohort study. *BMC Infectious Diseases*, 15(1), doi:10.1186/s12879-015-1062-1
- Nobahar, M., Razavi, M. R., Malek, F., & Ghorbani, R. (2016). Effects of hydrogen peroxide mouthwash on preventing ventilator-associated pneumonia in patients admitted to the intensive care unit. *The Brazilian Journal of Infectious Diseases*, 20(5), 444-450. doi:10.1016/j.bjid.2016.06.005
- Ostti, C., Wosti, D., Pandey, B., Camp, S., & Zhao, Q. (2017). Ventilator-Associated pneumonia and role of nurses in its prevention. *Journal of Nepal Medical Association*, 56(208), 461-8. doi:10.31729/jnma.3270
- Timsit, J., Esaid, W., Neoville, M., Boudriad, A., & Mourvilleir, B. (2017). Update on ventilator-associated pneumonia. *Pubmed*. <https://pubmed.ncbi.nlm.nih.gov/29225790/>
- Ganache, J., & Harrington, A. (2020). How common is ventilator-associated pneumonia (VAP) and what is the mortality rate? *Medscape*. <https://www.medscape.com/answers/30015719083/how-common-is-ventilator-associated-pneumonia-vap-and-what-is-the-mortality-rate>
- Koenig, S. M., & Truitt, J. D. (n.d.). Ventilator-associated pneumonia: Diagnosis, treatment, and prevention. <https://pubmed.ncbi.nlm.nih.gov/17041138/>

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