

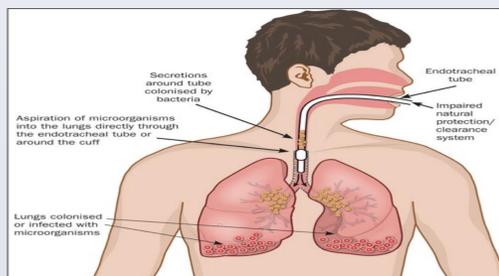
# "Treating patients with Ventilator-Associated Pneumonia (VAP) :The Challenges of Implementing Nursing Bundles of Care"

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## Introduction

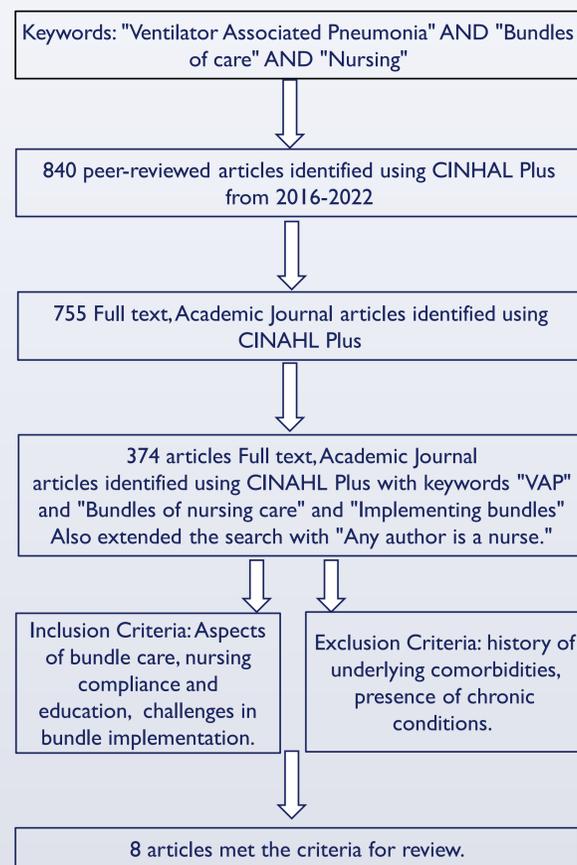
- Many patients admitted to the intensive care unit (ICU) require the support of a mechanical ventilator. This puts patients at a higher risk of acquiring Ventilator Associated Pneumonia (VAP).
- Mechanical ventilation provides patients with life-saving breathing support. Ventilated patients present complex issues to nurses such as: pneumothorax, pulmonary edema, hypoxemia, etc., and require multiplex medical treatment.
- It is essential that bedside ICU nurses perform effective care bundle interventions to minimize the risk of infection and development of VAP. This way, the length of patient hospital stay is minimized, treatment costs can be reduced and patient quality of life is improved.
- VAP is preventable, and application of Evidence-Based Practice (EBP) in the daily care of mechanically ventilated ICU patients is vital in decreasing infection rates. By identifying the challenges of implementing nursing bundles of care, VAP rates will decrease and the health promotion and prevention of VAP will increase. Nursing bundles of care decrease length of hospital stay and treatment costs, and increase quality of life.



## Background

- A ventilator is any device used to support, assist, or control respiration (inclusive of the weaning period) through the application of positive pressure to the airway when delivered via an artificial airway, specifically an oral/nasal endotracheal or tracheostomy tube.
- The Registered Nurse is in a key position to mitigate the risk of VAP due to their constant presence at the bedside and their key role in providing direct patient care.
- VAP accounts for 32% of all Hospital Acquired Infections (HAI). VAP is a HAI that is common in patients who are under long-term mechanical ventilation for more than 48 hours.
- Mechanical ventilation increases the risk of Pneumonia 6-to-21-times, and there is a high prevalence of HAIs in the ICU (Mahmudin).
- Despite having life-saving benefits, there is a high prevalence of HAIs in the ICU, and patients are at a higher risk of developing VAP due to mechanical ventilation.
- The use of endotracheal tubes increases the prevalence of VAP due to the increased risk of injury to the mucosal ciliary function that causes damage to upper airway defense and the accumulation of subglottic secretion.
- VAP nursing care bundles are a series of preventative care interventions for patients with mechanical ventilators. This provides nurses a strict standard of care such as: head of the bed elevation, oral hygiene, assessment of sedation, peptic ulcer prophylaxis, cuff pressure control, endotracheal tube suctioning and emptying of condensate in tubing etc.,
- Skilled nursing and compliance are crucial strategies to make appropriate decisions in patient care, minimize risks to patients and prevent poor outcomes in the recovery of mechanically ventilated patients.
- Mortality rates are 46% in patients with VAP and 32% in those without VAP. The cost of a care for a patient with VAP is approx. \$40,000 to \$57,000 higher per occurrence than the cost of care of a patient treated with mechanical ventilation in whom VAP does not develop.
- As it is implemented altogether, nursing care bundles will significantly decrease length of hospital stay, decrease treatment costs and increase patient quality of life when compared to the individual application of care bundles.

## Methods



## Results

### #1. VAP bundles significantly reduce days on a ventilator and days in the ICU.

- When implementation of VAP bundle care interventions occurred on an ICU unit:
  - Length of stay in the hospital decreased by more than 10 days, from 36 to 27 days.
  - Length of time under the assistance of mechanical ventilation reduced, by 5 days, from 26-21 days.
  - Incidence of VAP reduced by 8, from 23.4 to 15.4. This outcome is directly correlated to the implementation of VAP bundle care interventions by nurses.
- Within the first year of implementing VAP bundle care interventions, the number of overall days patients spent on a ventilator decreased by 5%.

### #2. What is in the care bundle matters.

- High nursing compliance with all bundle elements results in a decreased incidence of VAP.
- To reduce the incidence of VAP, nurses must be compliant with at least five bundle elements.
- There are 6 components of the bundle most found to have occurred:
  - Oral hygiene, positioning of patient, cuff pressure, sedation assessment, deep vein thrombosis prophylaxis and peptic ulcer prophylaxis.
- The most frequently used VAP care bundles:
  - Positioning of patient
  - Ensuring recommended cuff pressure
  - Recommended angle of HOB
  - Oral care and hand hygiene

- The least commonly used parts of bundles:
  - Use of recommended respiratory equipment
  - Avoidance of gastric distention
  - Kinetic bed therapy
  - Suctioning according to protocols
  - Management of sedation & analgesia

### #3. Nursing compliance is related to education and years of experience.

- 56.7% ICU nurses had excellent knowledge of VAP bundle care interventions.
- 43.4% ICU nurses had good knowledge of VAP bundle care interventions.
- It is shown that there is a positive correlation between nurse knowledge and nursing compliance with VAP bundle care interventions.
- The nurses' knowledge of VAP bundles is associated with which shift the nurses work. The same study has shown that 52% of nurses working night shift had excellent knowledge of VAP bundles.

### #4. Barriers to nursing adherence is related to use of bundles.

- The VAP care bundle provides a structured approach to nursing care. This means there is a necessity for policies and procedures that supports using Evidence Based Practice to improve practice.
- Nurses need to be provided with a standard methodology identifying the care bundle, the time it must be done and instructions on how to perform this care. It is not the nurses' duty to remember this care, but the hospitals duty to nurses to provide appropriate tools to provide optimal patient care.
- Providing reminders in the Electronic Health Record (EHR) would be helpful, however excessive prompting may result in alarm fatigue.
- Preventative care is not always the main priority when providing patient centered care because high acuity takes priority over preventive care. Essentially, this means nursing implementation is inconsistent.
- There is a high need for an interdisciplinary approach.
- The sedation and weaning process varies by prescriber, therefore it is not standardly and consistently completed.

### #5. Institutional barriers that affect nursing adherence to the use of bundles.

- Factors such as: lack of guidelines, high treatment costs and role ambiguities between nurse's role, and policies and procedures determining interventions contribute to institutional barriers.
- Preventative care is not always a main priority; this care is susceptible to nursing and physician variation.

## Discussion

- Nursing implementation of VAP bundles of care is imperative to decrease the prevalence of VAP, the number of days patients spend on a ventilator and time spent in the ICU.
- It is important that careful consideration is taken when determining what is in a VAP nursing bundle of care to decrease incidence rate of VAP and increase nursing compliance.
- Effective communication is a powerful tool that can be used to equip bedside ICU nurses with the proper education on VAP care bundles to meet the goal of preventing VAP in ICU patients.
- It is essential that nurses are provided with a standardized approach to VAP care bundles that are EBP's to increase nursing adherence to care bundle interventions and decrease VAP prevalence.
- Overcoming institutional barriers and variation will propel adequate reinforcement and reminders of VAP bundle interventions for ICU nurses at the bedside.



## Conclusions

- It is ultimately up to nursing staff to reduce infection rates.
- Hospitals need to provide standardized nursing policies to further enforce EBP's at the bedside, and support nursing care.
- Effective communication between nursing management and bedside nurses in the ICU is ultimately the best strategy to enforce education. In turn, this will increase nursing compliance.
- Increasing nursing compliance of VAP bundle care interventions will reduce infection rates.
- In the future, to provide optimal care for mechanically ventilated patients and reduce VAP infection rates, hospitals must take action to create effective change in nursing policies and overcome institutional barriers which impact patient care.

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