The Effectiveness of a Ventilator Care Bundle Protocol in Decreasing Incidence of Ventilator-Acquired Pneumonia: A Scoping Review

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Purpose

To assess whether compliance and increased frequency of ventilator care bundle (VCB) utilization decreases incidence of ventilator-acquired pneumonia (VAP).

Background

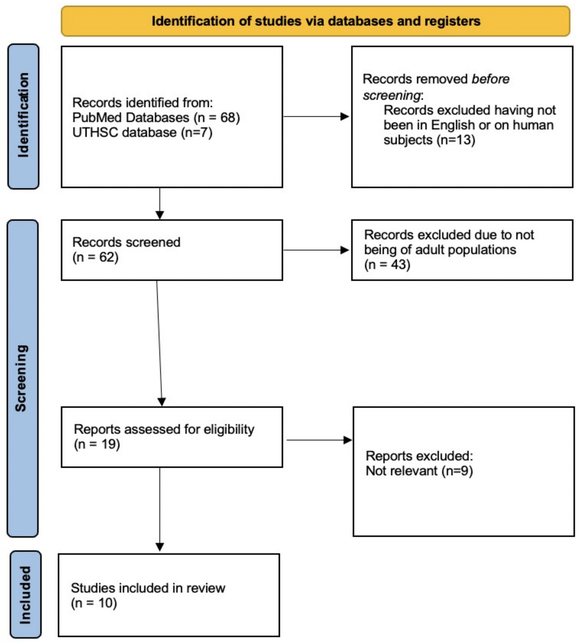
- Ventilator-acquired pneumonia (VAP) is the most common hospital-acquired infection with the highest mortality rate of device-associated infections.
- VAP increases hospital length of stay, intensive care unit (ICU) length of stay, and the duration of mechanical ventilation.
- Ventilator care bundle compliance and documentation are inconsistent across hospitals, so true efficacy is hard to measure to assess the effectiveness of utilization of ventilator care bundle towards incidence rates of ventilator-acquired pneumonia.

Methods

- **Design:** A Scoping Review utilizing databases CINAHL, PubMed, Medline
- **Search Duration:** August 2020 until November 2022
- **Search terms:** (Ventilator) AND (Care Bundle) AND (Pneumonia) → Process shown in the chart on right.
- **Search criteria:** peer-reviewed published in English, adult patients 18 years or older, admitted to the ICU, and mechanically ventilated for diagnosis other than pneumonia
- **10 final articles** rapid critically appraised to analyze and synthesize results
- **Data items noted:**
  - Age, gender, race
  - Social history (nicotine use)
  - Diagnosis
  - Cause of intubation
  - ICU length of stay
  - Hospital length of stay
  - Completion of VCB
  - ICU mortality rate
  - Incidence of VAP

Methods

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only



Results

- The outcomes observed and a synthesis of the results from each article

↑, ↓, —, NE, NR, √	1	2	3	4	5	6	7	8	9	10
Outcome: ICULOS	—	NE	—	NE	NE	NE	↓	NE	↓	↓
Outcome: HLOS	NR	NE	—	NE	↓	NE	NE	NE	↓	NR
Outcome: DMV	↓	NE	—	NE	↓	NE	↓	↓	↓	↓
Outcome: VAPIR	↓	↓	↓	↓	↓	↓	↓	↓	↓	NR; HAP did ↓
Outcome: ICUMR	—	—	—	NE	↓	NE	—	↓	↓	↓

Article Key: 1. Adiyeke et al., 2021 2. Akdogan et al., 2017 3. Burja et al., 2018 4. Chahoud et al., 2015 5. Klompas et al., 2016 6. Malouf-Todaro et al., 2013 7. Parisi et al., 2017 8. Perez-Granda et al., 2014 9. Pileggi et al., 2018 10. Roquilly et al., 2013

Legend: ICULOS= Intensive Care Unit Length of Stay, HLOS=Hospital Length of Stay, DMV=Duration of Mechanical Ventilation, VAPIR=Ventilator Acquired Pneumonia Incidence Rate, ICUMR= Intensive Care Unit Mortality Rate

HAP = Hospital-acquired pneumonia

↑= increased, ↓= decreased, — = no change, NE = not examined, NR= not reported, √ = applicable or present

Results

- The scoping review included:
  - 2 systematic reviews
  - 1 controlled trial without randomization
  - 6 case-control studies
  - 1 quality improvement project
- Each article provided evidence supporting staff compliance with a VCB improved patient outcomes
- Outcomes included:
  - Decreased incidence of VAP
  - Decreased hospital length of stay
  - Decreased ICU length of stay
  - Decreased patient mortality

Implications for Practice

- Ventilator care bundle protocols and checklists increase the compliance of staff completion of the tasks.
- Increased compliance with ventilator care bundles improves patient outcomes by decreasing incidence rates of ventilator-acquired pneumonia, decreasing intensive care unit length of stay, decreasing hospital length of stay, and decreasing the overall number of days a patient is mechanically ventilated.
- Implementation of ventilator care bundle protocols with checklists allows for more effective management of resources.

References