

Systematic review of barriers and facilitators of evidence-based care for patients with ARDS

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SUMR Scholars Symposium

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Outline

1. Acute Respiratory Distress Syndrome (ARDS) as an illness in the Intensive Care Unit (ICU)
2. Evidence-based methods for treating ARDS in the ICU
3. Methods and preliminary results of a systematic review
4. Reflections as a Palliative and Advanced Illness Research (PAIR) Center intern

Background

- The Intensive Care Unit (ICU) is a special department for intensive care medicine, patients may have multiple ailments so need attention from different specialists.
- Acute respiratory distress syndrome (ARDS) is characterized by severe respiratory failure and associated with common conditions such as pneumonia, infections, and trauma.
- The main complication in ARDS is that fluid leaks into the lungs making breathing difficult or impossible.
- Symptoms include shortness of breath, fast heart rate, rapid breathing.

A patient with ARDS in the ICU



Treatment for ARDS

- There is no direct cure for ARDS.
- Studies have shown three interventions to be effective in reducing patient mortality among patients with ARDS:
 - low tidal volume ventilation
 - limited inspiratory pressures
 - prone positioning

Mechanical ventilation

- Administration of artificial breaths from a machine for patients who should not or cannot breathe adequately on their own
- Clinicians set the amount of air per breath, how frequently a patient receives breaths, and the amount of oxygen in air, among other settings



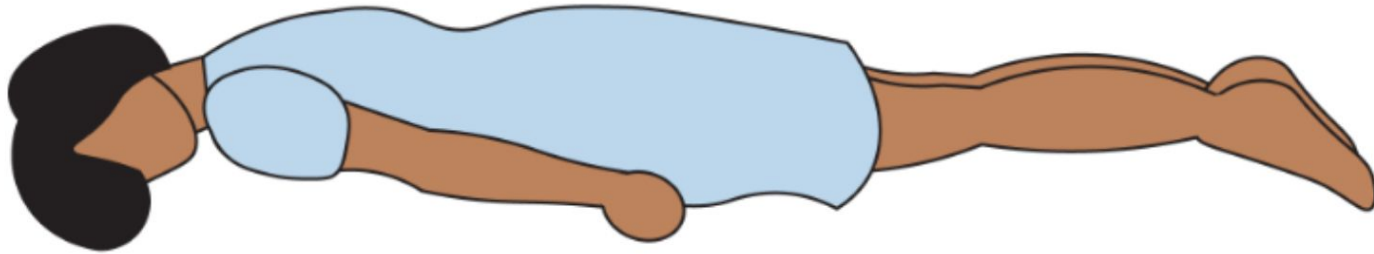
Low tidal volume ventilation

- “Tidal volume” is the amount of air per artificial breath.
 - Too much can injure lungs by overstretching them.
- In 2000, a randomized clinical trial (RCT) showed a “low” tidal volume set at 6ml/kg of predicted body weight (compared to 12ml/kg) resulted in lower mortality among patients with ARDS.

Limited inspiratory pressure

- “Inspiratory pressure” is the amount of pressure in the lungs at the end of inhalation of the artificial breath.
 - It’s closely related to but not the same as tidal volumes.
- In the same RCT, the intervention group received both low tidal volumes and limited inspiratory pressures – the combined intervention resulted in lower mortality.
 - Mortality reduction 40% to 31%

Prone Positioning



Prone

Prone Positioning



Prone Positioning Video



<https://www.youtube.com/watch?v=bE4mmGdjA5I>

Prone positioning

- In 2013, an RCT of patients with severe ARDS demonstrated that patients who underwent prone positioning for 16 hours per day until their oxygen levels improved had lower mortality than patients who did not.
 - Mortality reduction from 33% to 16%

Significance

- Recent observational studies have shown that many patients with ARDS do not receive these three evidence-based therapies.
 - As few as 20% of patients in some hospitals receive low tidal volumes.
 - As few as 10% of patients in some hospitals receive prone positioning.

Primary research question

- For adult patients in ICUs with ARDS requiring mechanical ventilation, what are determinants of implementation of:
 - low tidal volume ventilation
 - limited inspiratory pressures
 - prone positioning

Methods

- Conduct a systematic literature review
 - Develop and implement a search strategy using multiple databases
 - Screen abstracts
 - Review full text of remaining articles for final inclusion
 - Extract data from full texts
- Map the findings to the Consolidated Framework for Implementation Research (CFIR) to identify and classify barriers and facilitators of implementation

Literature Inclusion/Exclusion criteria

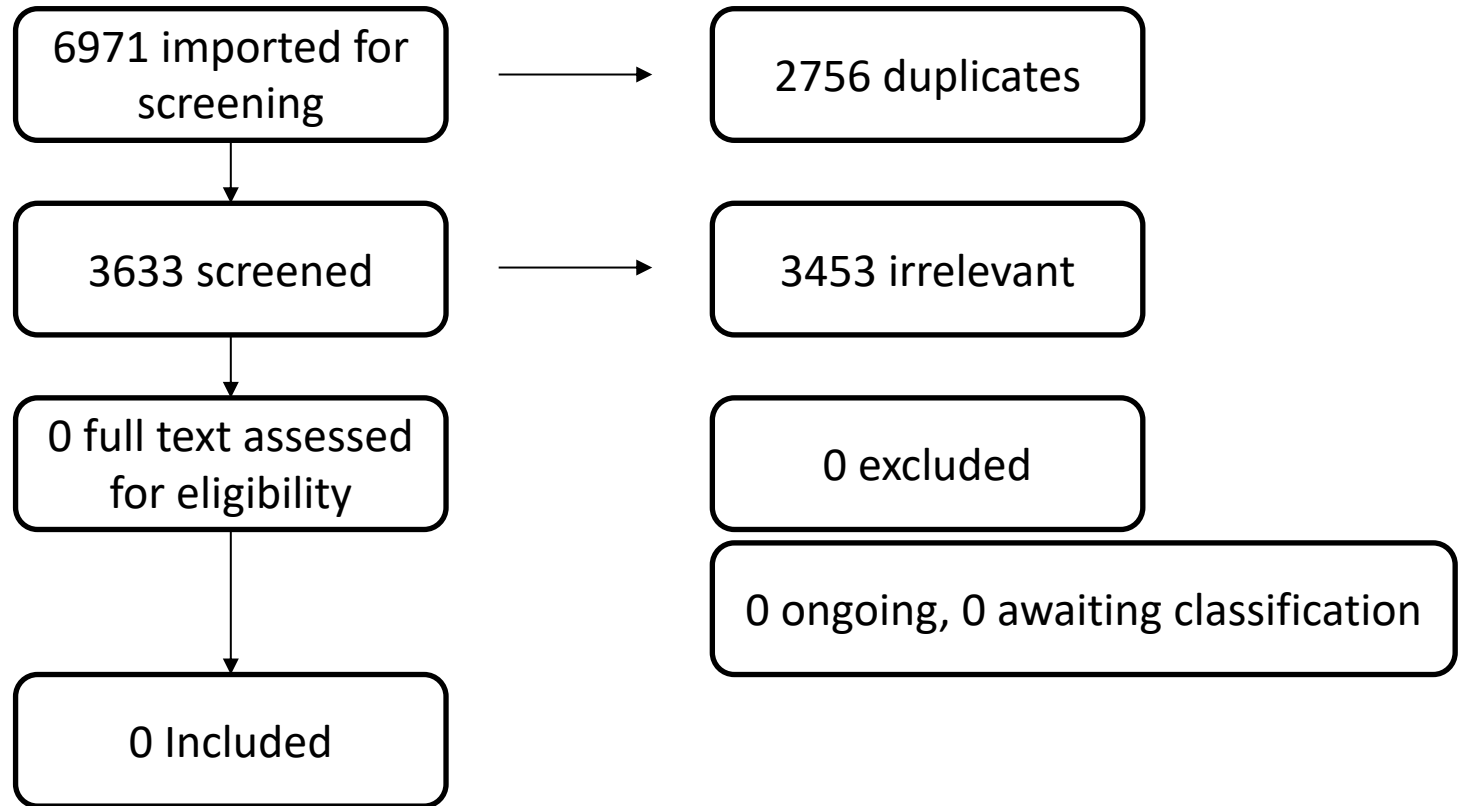
Inclusion criteria:

- Adult patients (18+ yrs.)
- Patients located in an ICU
- Study design must be quantitative, qualitative, or mixed-methods

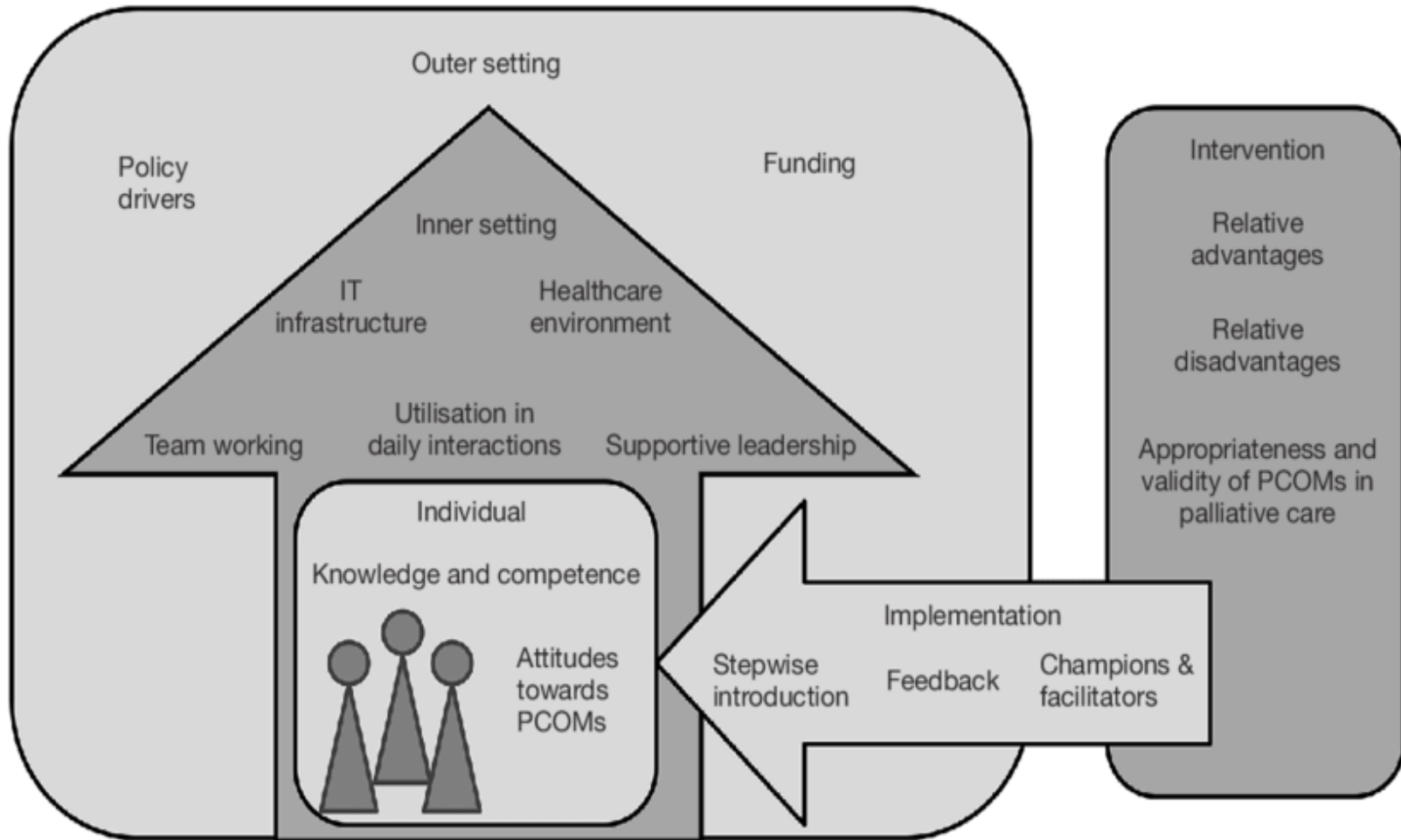
Exclusion criteria:

- Non-English articles
- Articles focused on patient-level factors (e.g. age)
- Study design was case study, editorial, or opinion piece

Findings of Studies - PRISMA



Consolidated Framework for Implementation Research



Goals and Lessons learned

1. Gain experience in critically evaluating literature
2. Learn how to formulate a good research question
3. Learn more about the physician-scientist career pathway

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