AAC interventions for mechanically ventilated and tracheostomized patients in critical and acute care: A scoping review

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Introduction

Nonspeaking mechanically ventilated & tracheostomy patients in ICU or ER:

- Have obstructed airways for speech making participation in their care difficult
- Are associated with increased risk of medical errors (Nordess & Beukelman, 2017)
- Can experience significant anxiety, panic, depression, sleep disruptions, & PTSD symptoms even after discharge (Alasad & Ahmad, 2005)
- May experience more severe delirium given reduced interpersonal engagement (Freeman-Sanderson et al., 2020)
- Present a complex challenge to person-centered care
- Are entitled to reciprocal, unambiguous interactions with providers facilitating meaningful participation in their care according to Joint Commission (2010) standards

AAC interventions for this population:

- Are increasingly feasible given standard use of lighter sedation protocols. An estimated 50% of ICU patients are sufficiently aware to communicate given effective tools (Nordess & Beukelman, 2017)
- Have been studied across disciplines of nursing, palliative care, otolaryngology, disability studies, cardiothoracic medicine, and speech-language pathology

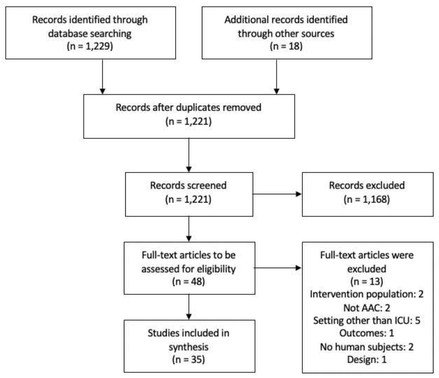
Objectives

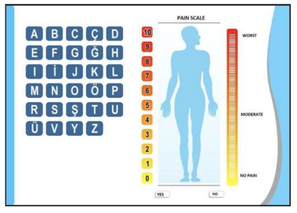
This scoping review investigated:

- The nature and extent of research on AAC interventions for mechanically ventilated and tracheostomy patients
- The variables used to demonstrate efficacy of these interventions in terms of health and/or communication
- The range of variables used to conclude that communication was effective for this population
- Critical gaps in the literature about AAC interventions in this setting with the population
- Future directions for research in this area

Methods

- **Scoping review** methodology (Arskey & O'Malley, 2005; Levac et al., 2010)
  - Explores a broad range of dependent variables used in the setting
  - Includes pre-experimental investigations of emergent developments in AAC technology
- **PRISMA-ScR** (Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews Checklist and Explanation) (Tricco et al., 2018)
- **Open Science Framework** protocol registered
- **Electronic database searches:** Web of Science, PubMed, PsycINFO, Academic Search Complete
- **Other searches**: Forward citation and ancestry searches of key articles
- **Eligibility criteria**: Conducted in acute care or ICU, tracheostomized and ventilated patients with "nonspeaking" status, used AAC with human subjects, dependent variables were health or communication related, pre-experimental studies and grey literature that met established scoping review eligibility criteria.
- **Methodological quality appraisal:** Conducted according to a certainty framework; studies were designated *conclusive, preponderant, suggestive*, or *inconclusive.* Effect sizes were calculated for conclusive or preponderant studies (Schlosser, 2001).
- **Reliability measures:** 100% interobserver agreement for inclusion based on eligibility criteria, data charting, quality appraisal, & effect size calculation.





Results

Qualifying studies (n=35) by intervention type:

- High-tech and no-tech visual interface-based interventions
  - Speech-generating devices (9)
  - Communication boards (8)
  - Single-item communication board (1)
  - Eye-tracking devices (2)
- Systematic nurse AAC training interventions (4)
  - Study of Patient-Nurse Effectiveness with Assisted Communication Strategies (SPEACS) & SPEACS-2
  - Communicative intent action research
- Speech-augmenting interventions
  - Electrolarynx (2)
  - Above-cuff vocalization (3)
  - Speaking valves (2)
  - Ventilator adjustment (1)
- Multidisciplinary team and combination method interventions (4)

Quality Appraisal: Most studies (n=25) were designated *inconclusive* or *suggestive.*

Effect sizes: Were calculated for studies designated *conclusive* (n=2) or *preponderant* (n=8) with eta-squared, Cramer's v, Cohen's d, or Pearson correlation coefficient. Interventions that indicated small to large effects of AAC on communication and/or health for this population included:

- Speech augmenting (BLUSA speaking valve) (*conclusive*)
  - Large effect (d=1.2) for improved mean Voice-Related Quality of Life score from pre- to posttreatment for intervention vs. control group
- Communication boards (EZ Board):
  - Large effect for improved ease of communication (d=.86) and anxiety scale scores (d=.54). Small effect (d=.48) for greater use of the board after a brief nurse training, and for greater use of any communication device by nurses in 1 week posttest.
- Speech-generating devices (SFM-V, My Voice, CBCA):
  - Large effects for patients' increased satisfaction with communication (d=3.6) and improved overall self-reported patient symptoms ($\eta 2$= .26). Medium effects for decreased anxiety symptoms (r=.3), and increased comfort (d=.7) (paranesthesia) with SGD.
- Nurse trainings (SPEACS & SPEACS-2)

  (SPEACS-2) (*conclusive*)
  - Medium effect (d=.52) for decreased negative nurse attitudes towards nonspeaking patients
  - Small effect (d=.45) for improvements in nurses knowledge base and willingness to use AAC.

  SPEACS (*preponderant*)
  - Large effects (d=1.1) for increased positive nurse behavior towards nonspeaking patients with delirium.
  - Other large & medium effects detected across phases of the study, but not in posttest measures.
- Multidisciplinary team (Tracheostomy Review and Management Service)
  - Medium effect (r =-.28) for earlier use of speaking valves after TRAMS by median 16 days. Small effect (r = -.23) for decreased median length of hospital stay. Significant increase in overall speaking valve use after TRAMS.

Conclusions

Data supports AAC intervention efficacy for nonspeaking patients in critical care in these domains:

Psychosocial: Anxiety, comfort, quality of life

Communication: Perceived difficulty, ability to convey messages effectively, satisfaction with patient-provider exchanges, voice-related quality of life

Institutional culture: More RN AAC use, more communicative RN exchanges, more positive RN communication with patients with delirium, greater RN AAC knowledge and comfort, improved RN attitudes

Health: Earlier recovery of functional speech, modest length of hospital stay decreases, patient report of improved symptoms

Future Directions:

1. Role of communication in mental status fluctuations and delirium progression/resolution
2. Patients with delirium can use eye-tracking (Garry, 2016)
3. "Just-in-time" bedside training; fast & easy (Gormley, 2019)
4. Early AAC intervention pre-operatively to improve surgical outcomes (Rodriguez et al., 2016)

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References

Poster