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Evaluation of pharmacist intervention on spontaneous awakening trials (SAT) in ventilated patients

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Disclosure Statement

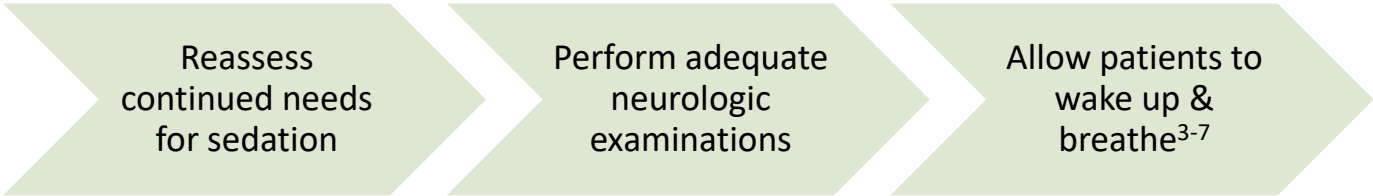
The authors of this study have no financial interest or personal relationships with commercial entities (or their competitors) that may be referenced in this presentation.

Presentation Objective

Review the impact of pharmacist involvement on adherence to spontaneous awakening trials (SATs) in mechanically ventilated patients.

Background

- Intensive care unit (ICU) patients regularly require use of continuous sedation to decrease stress associated with mechanical ventilation, agitation, overall discomfort, etc.[1]
- SATs have been implemented into standard of care to prevent oversedation & improve patient outcomes[2-4]
- Interruptions of continuously infused sedatives are recommended daily in qualifying patients to:



Spontaneous Awakening Trials

- Nonbenzodiazepine sedatives preferred over benzodiazepines in certain populations to improve short-term outcomes
  - Short durations of benzodiazepines are recommended due to unpredictable awakening & time to extubation
  - Highlights the importance of performing SATs properly
- Often not performed when indicated and may not be appropriately conducted
- Literature has shown pharmacist involvement may lead to shorter weaning times & reduced rates of medication-related adverse events[7,8]

Study Purpose

To determine the impact of pharmacist involvement on adherence to a nursing-driven protocol for performance of SATs and on total days of mechanical ventilation.

Study Design

- **Bi-phasic IRB-reviewed study**
  - Retrospective: April – September 2022
    - Random sample of patients on continuous IV sedation
  - Prospective: October – March 2023
    - Pharmacist intervention on qualifying patients
- **Setting: Baptist Health South Florida**
  - 5 ICUs
- **Statistical analysis**
  - Nominal variables: Chi-square and Fisher's exact test
  - Continuous variables: Student's *t*-test, Mann-Whitney U test

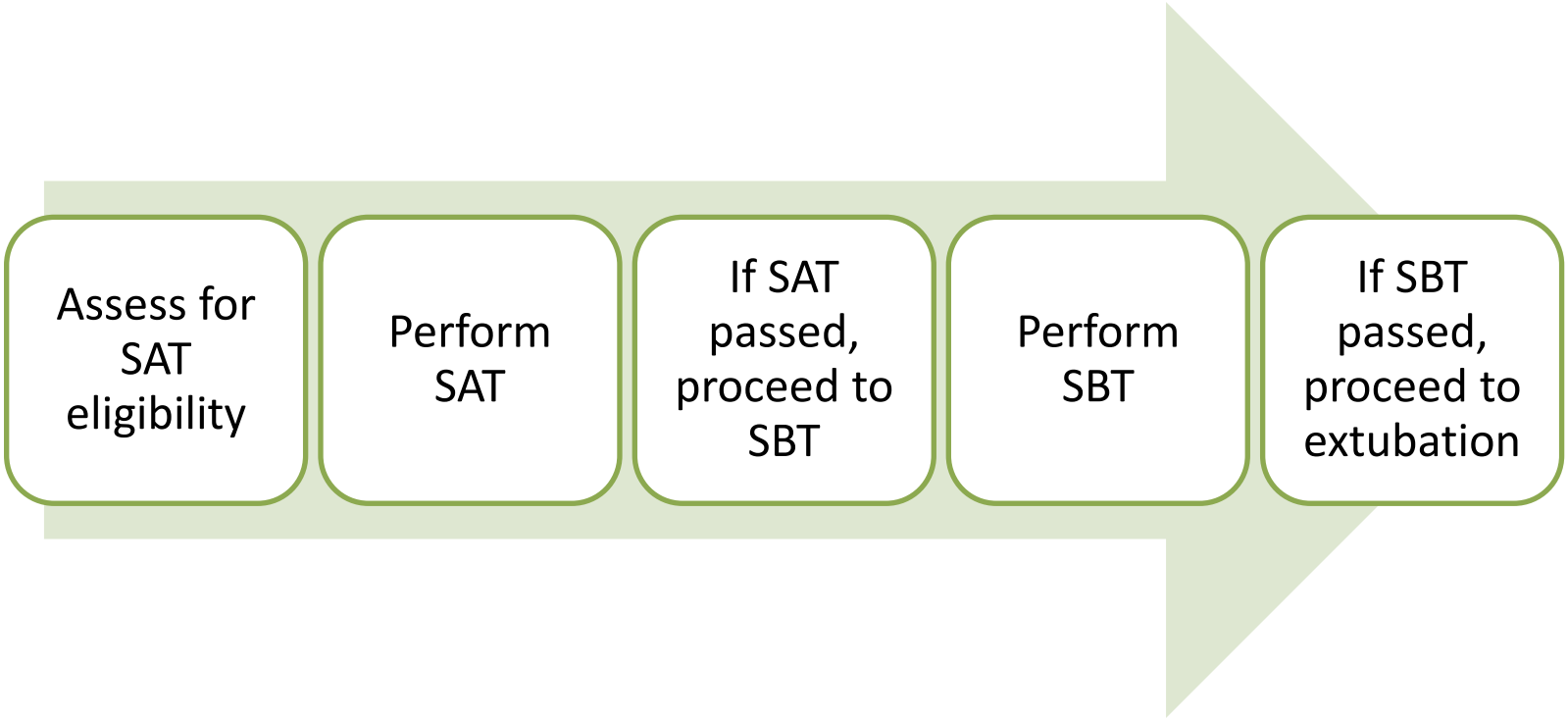
Eligibility Criteria

Inclusion Criteria	Exclusion Criteria
• Patients ≥ 18 years old • ICU admission during study period • Mechanically ventilated > 48 hours • Receiving sedation &/or analgesia with continuous IV midazolam, propofol, or fentanyl	• Receiving continuous IV paralytic agents • Indication for continuous infusion other than sedation • Anticipated tracheostomy placement after 48 hours

Indications for SAT

- **Patients on continuous sedatives and/or analgesic drips with:**
  - FiO_2 less than 70%
  - SpO_2 greater than 88%
  - Respiratory rate (RR) ≤ 30 breaths per minute
  - PEEP ≤ 10 cm H_2O
  - Hemodynamically stable
- **Do not meet criteria if**:
  - Ventilator settings are not in range with parameters listed above
  - Patient is receiving paralytics
  - Provider specifies NOT to do a SAT
  - Receiving sedatives for a reason other than sedation (i.e., seizures, alcohol withdrawal, ICP management)

Spontaneous Awakening Trial Process



Spontaneous Awakening Trial Process

Pass

Continue to hold sedation

Attempt spontaneous breathing trial (SBT)

Agitation or anxiety:

Start PRN doses

Initiate same sedative/analgesic agent on at initiation rate

Fail

Propofol or dexmedetomidine:
Restart at half the pre-SAT drip rate

Midazolam:
BOLUS midazolam 2 mg IV q 15 min x 2, then restart at half the pre-SAT drip rate

Fentanyl:
BOLUS fentanyl 50 mcg IV x1, then restart at half the pre-SAT drip rate

Outcomes

Primary Outcomes

- SAT compliance
- Number and type of pharmacist interventions

Secondary Outcomes

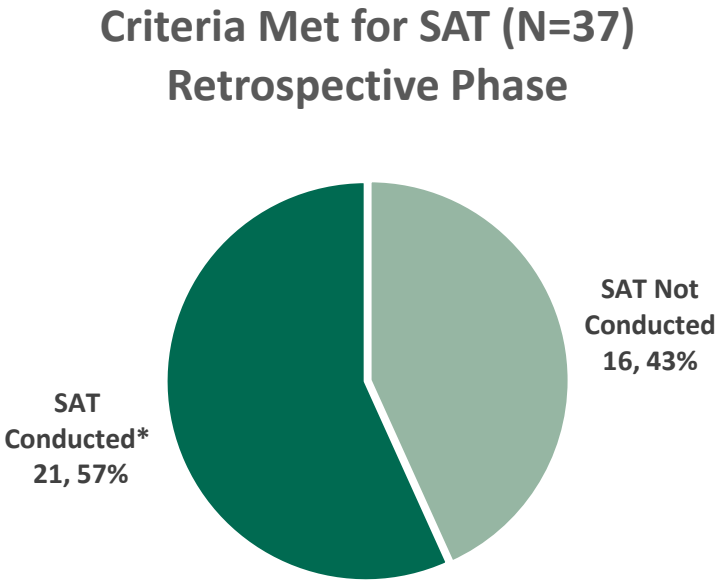
- Days of mechanical ventilation
- ICU length of stay

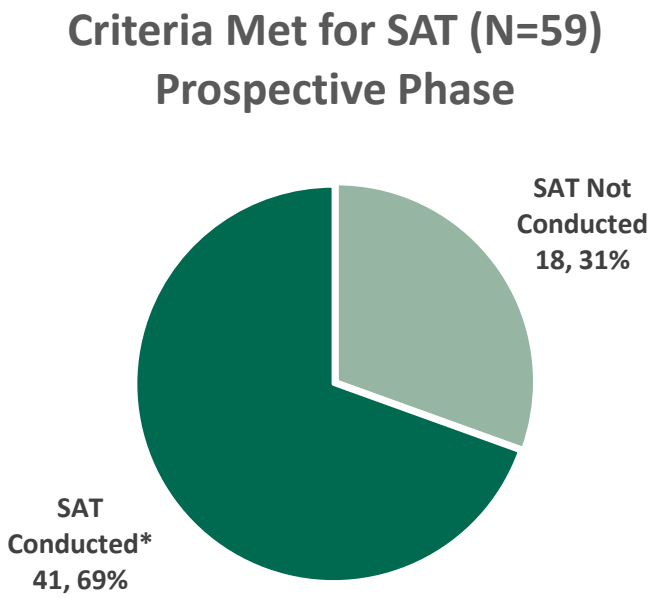
Baseline Characteristics

	Retrospective N=37	Prospective N=59	P Value
Mean age, years (± SD)	56 (±19)	66 (±14)	0.06
Sex – male, n (%)	15 (41)	36 (61)	0.05
APACHE II Score*, median (IQR)	15 (0-24)	16 (7-28)	0.08
Diagnosis, n (%)			
Acute respiratory failure	12 (32)	16 (27)	0.58
Altered mental status	11 (30)	15 (25)	0.65
Sepsis	6 (16)	3 (5)	0.08
Cardiac arrest	1 (3)	7 (12)	0.15
COPD or asthma exacerbation	0	9 (15)	0.03
Myocardial infarction	0	4 (7)	0.16
Other	8 (22)	5 (8)	0.12
Sedative &/or analgesic agent utilized when criteria met for SAT			
Fentanyl + midazolam	24 (65)	22 (37)	0.01
Fentanyl + propofol	4 (11)	16 (27)	0.07
Midazolam	0	2 (3)	0.52
Propofol	2 (5)	14 (24)	0.02
Other	7 (19)	5 (8)	0.2

*Acute Physiology and Chronic Health Evaluation

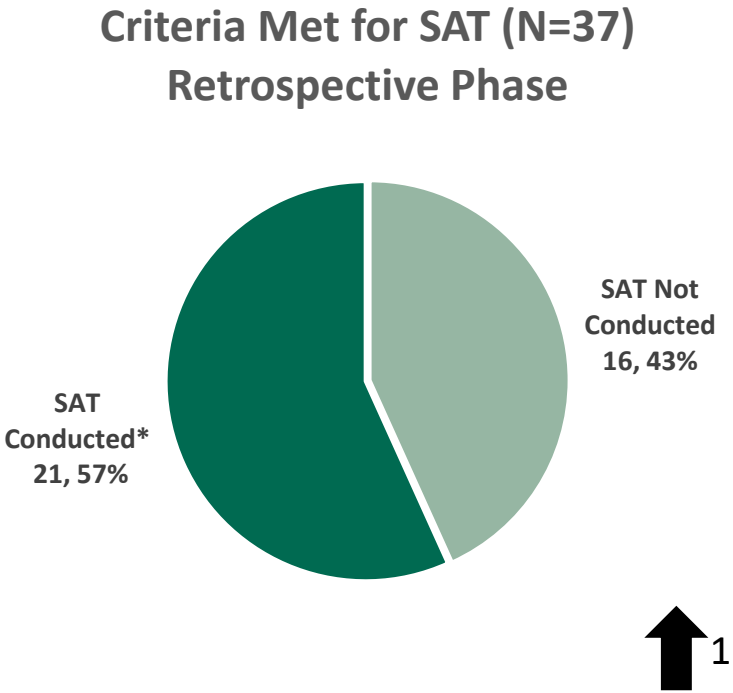
Primary Outcome

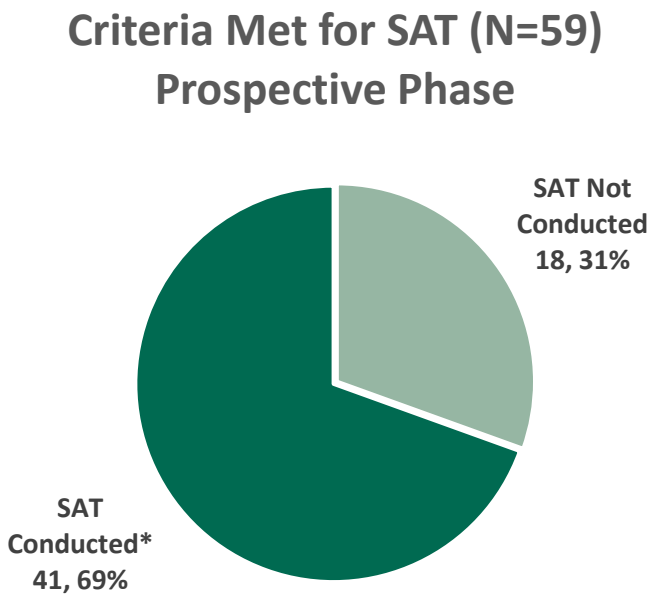




*P=0.2

Primary Outcome





12%

*P=0.2

Reason SAT Not Conducted

Documented Reasons Against SAT, n (%)	Retrospective (n=16)	Prospective (n=18)
Not documented	15 (94)	5 (28)
No plans for extubation	1 (6)	4 (22)
Pending procedure	0	6 (33)
Hemodynamic instability documented	0	3 (17)

Pharmacist Interventions

Type of Intervention	Total Number of Interventions	Interventions Accepted
SAT Recommended	59	41
Other	27	27
Total	**86**	**68**
79% Acceptance Rate		

Secondary Outcomes

Variable	Retrospective (n=37)	Prospective (n=59)	P Value
ICU length of stay (days), median	11.42	11.1	0.17
Mechanical ventilation duration (days), median	8	9	0.53

Limitations

- Unable to evaluate total daily dose of continuous sedatives & analgesics
- Convenience sample
- Inconsistent documentation in retrospective phase
- Pharmacist interventions in retrospective phase not assessed

Conclusions

79% of pharmacists' recommendations were accepted

Pharmacist intervention resulted in an increase from 57% to 69% SATs performed

Differences in sedatives used may have impacted duration of mechanical ventilation

Future Directions

Nursing re-education on SAT indications and how to appropriately conduct SATs

Streamlining documentation of pharmacists' SAT interventions

Self Assessment

- What are known benefits of performing daily spontaneous awakening trials?
  a) Decrease ICU length of stay
  b) Prevent oversedation
  c) Decrease duration of mechanical ventilation
  d) All of the above

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