Don’t Ignore the Score: An Obstructive Sleep Apnea Screening Protocol

Linda Lakdawala DNP, RN, CPAN
Objectives

• The learner will understand the:
  – need for a surgical obstructive sleep apnea screening tool.
  – process of implementing an evidence-based practice sleep apnea guideline in a shared leadership environment.
  – Iowa Model of Evidence-Based Practice process.
Introduction

• Personal Interest and focus
  • Passion nursing excellence

• PACU Nurse assessment process
  • Self discovery vulnerable sleep apnea patient
  • How can we be sure patients are safely cared for?

• Capstone project: Doctorate Nursing Practice

• Goal: promote best practice for nurses to screen patients for obstructive sleep apnea
Patient Population

- **Obstructive** sleep apnea (OSA): common condition caused by decrease in upper airway size and patency during sleep
- Apnea: cessation of airflow ≥ 10 seconds
- Hypopnea: ↓ airflow > 10 seconds + 30% ↓ airflow + at least 4% oxygen desaturation
- Polysomnography: Apnea Hypopnea Index (AHI)
  - AHI 5-14/hr. mild
  - AHI 15-30/hr. moderate
  - AHI>30/hr. severe
OSA Cycle: Path to Comorbidites

- Individuals with OSA are aroused repeatedly from deep sleep by hypoxemia and hypercapnia
- Cycle: Permits breathing to resume

http://www.sleepconsultants.com/sleep%20apnea.html
Figure 1: Flow diagram demonstrating the pathophysiology of OSA and the danger of sedative agents and respiratory depressants in this setting.

Figure 1: Respiratory pattern is inhibited with opiates and sedatives (Finkel, Saager, Becker, & Tymkew, 2006).
Why a Screening Tool

- **PA Safety Advisory Board**: >250 cases poor patient outcomes
- **The Joint Commission**: Direct Impact Issue: Safety initiative anesthesia and sedation
- **National Clearinghouse**: safer outcomes with implementation of guidelines
- **ASA Task Force**: meta analysis: guidelines for care of perioperative OSA patient
Preoperative Assessment

• Focus: patient’s heart and lung history
  • Little emphasis on sleep disorders
  • Patients with unremarkable medical history developed unexpected postoperative respiratory complications
• 2-26% U.S. adult population: OSA
• 80-90% unaware of having OSA
PICO Prevention Question

• For patients in the perioperative area receiving anesthesia, sedation, or intravenous opioids, does the use of a screening tool to identify patients with obstructive sleep apnea, (OSA) reduce the risk of complications of OSA compared with those OSA patients who did not have a screening tool?
• **Population of Interest:** Perioperative patients receiving anesthesia, sedation or intravenous opioids.

• **Intervention:** Develop screening tool and guidelines for perioperative nurses to safely monitor patients with obstructive sleep apnea (OSA).

• **Comparison:** Evidence-based practice (EBP) nurse assessment screening tool for OSA versus current method which is no definitive screening tool.

• **Outcome:** An EBP screening tool for assessment of OSA will be used throughout the perioperative area.
### Berlin Questionnaire

<table>
<thead>
<tr>
<th>Questions</th>
<th>Answers</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category 1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Do you snore?</td>
<td>Yes(1), no(0) don’t know(0)</td>
<td>category 1: positive: Sum ≤2</td>
</tr>
<tr>
<td>2. If yes, how loud is it?</td>
<td><strong>Item 2:</strong> Slight louder than breathing (0)</td>
<td>category 2: positive: Sum ≤2</td>
</tr>
<tr>
<td>3. How often do you snore?</td>
<td>As loud as talking (0)</td>
<td>category 3: positive item 10</td>
</tr>
<tr>
<td>4. Has snoring bothered others?</td>
<td>louder than talking (1)</td>
<td>is yes or if BMI &gt; 30kg/m2</td>
</tr>
<tr>
<td>5. Has anyone noticed that you</td>
<td>very loud heard in adjacent rooms (1)</td>
<td><em>High risk of OSA</em>: 2 or more categories scored as positive</td>
</tr>
<tr>
<td>quit breathing during sleep?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Category 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. How often do you feel tired</td>
<td>nearly every day (1)</td>
<td></td>
</tr>
<tr>
<td>Or fatigued after sleep?</td>
<td>3-4 times a week (1)</td>
<td></td>
</tr>
<tr>
<td>7. During your waking time,</td>
<td>1-2 times a week (0)</td>
<td></td>
</tr>
<tr>
<td>do you feel tired, fatigued,</td>
<td>1-2 times a month (0)</td>
<td></td>
</tr>
<tr>
<td>or not up to par?</td>
<td>never or nearly never (0)</td>
<td></td>
</tr>
<tr>
<td><strong>Category 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Have you ever noded off or fallen asleep while driving?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. If yes, How often does this occur?</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Category 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Do you have high blood pressure?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### The American Society of Anesthesiologists’ Checklist

**Category 1: Predisposing Physical Characteristics**
1. BMI ≤ 35kg/m²
2. Neck circumference > 43cm/17 inches (men) or 40 cm/16 inches (women)
3. Craniofacial abnormalities affecting the airway
4. Anatomical nasal obstruction
5. Tonsils nearly touching or touching the midline

If ≤ 1 items in category are positive, category 1 is positive.

**Category 2: History of Apparent Airway**
1. Snoring (loud enough to be heard through closed door)
2. Frequent snoring
3. Observed pauses in breathing during sleep
4. Awakens from sleep with choking sensation
5. Frequent arousals from sleep

If ≤ 2 items in Category 2 are positive, category 2 is positive.

**Category 3: Somnolence**
1. Frequent somnolence or fatigue despite adequate “sleep”
2. Falls asleep easily in a nonstimulating environment
3. Parent or teacher comments child appears sleepy during the day, is easily distracted, is overly aggressive, or has difficulty concentrating*
4. Child often difficult to arouse at usual awakening time*

If ≤ +1 items in category 3 are positive, category 3 is positive.

* Refers to pediatric patients

**Scoring**
- **High risk of OSA**: 2 or more Categories scored as positive.
- **Low risk of OSA**: 1 or no categories scored as positive.

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*Gross et al. (2006)*
<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you a loud and/or a regular snorer?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Have you ever been observed to gasp or stop breathing during your sleep?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you feel tired or groggy upon awakening, or do you awaken with a headache?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you often tired or fatigued during the wake time hours?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you fall asleep sitting, reading, watching TV, or driving?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you often have problems with memory or concentration?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: www.sleepapnea.org (2008)
The Epworth Sleepiness Scale

Use the scale to choose the most appropriate number for each situation:

0 = would *never* doze or sleep
1 = *slight* chance of dozing or sleeping
2 = *moderate* chance of dozing or sleeping
3 = *high* chance of dozing or sleeping

<table>
<thead>
<tr>
<th>Situation</th>
<th>Chance of Dozing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sitting and reading</td>
<td></td>
</tr>
<tr>
<td>Watching TV</td>
<td></td>
</tr>
<tr>
<td>Sitting inactive in a public place</td>
<td></td>
</tr>
<tr>
<td>Being a passenger in a motor vehicle for an hour or more</td>
<td></td>
</tr>
<tr>
<td>Sitting and talking to someone</td>
<td></td>
</tr>
<tr>
<td>Sitting quietly after lunch (no alcohol)</td>
<td></td>
</tr>
<tr>
<td>Stopped for a few minutes in traffic while driving</td>
<td></td>
</tr>
<tr>
<td><strong>Total score (add up the scores)</strong></td>
<td></td>
</tr>
</tbody>
</table>
STOP-Bang OSA Scoring Model

- Answer Yes or No to each question and place an “X” in the corresponding column.

**Questions**

1. **Snoring**: Do you snore loudly (louder than talking or loud enough to be heard through closed doors?)
   - Yes: ___
   - No: ___

2. **Tired**: Do you often feel tired, fatigued, or sleepy during the daytime?
   - Yes: ___
   - No: ___

3. **Observed**: Has anyone observed you stop breathing during your sleep?
   - Yes: ___
   - No: ___

4. **Blood Pressure**: Do you have or are you being treated for high blood pressure?
   - Yes: ___
   - No: ___

5. **Height**: ____ft. ____in. **Weight**: _____lbs. **BMI Calculator**
   - **BMI > 35?**
     - Yes: ___
     - No: ___

6. **Age**: > 50 yr. Old?
   - Yes: ___
   - No: ___

7. **Neck Circumference**: > 17 in. or 40 cm.?
   - Yes: ___
   - No: ___

8. **Gender**: Male gender
   - Yes: ___
   - No: ___

**Total for Yes:**

- The patient is at high risk for OSA if they answered **yes to three or more** items.
- The patient is at low risk for OSA if they answered **yes to less than three** items.

Chung et al. (2008)
Iowa Model Algorithm for OSA Screening Tool

- **Trigger for EBP**: Need to improve current care of OSA patients.
- **Organizational Priority**: Promote excellence in patient safety outcomes.

- **Team Formation**: Linda Lakdawala: PACU RN, Quality Director, Chief Anesthesiologist, Informatics Nurse, Critical Care Advanced Practice Nurse.

- **Evidence Gathered**: Highest level literature review.

- **Research Base Critiqued and Analyzed**.
Iowa Model Process

- **Sufficient Evidence Gathered:** ASA Task Force (2006) Systematic Review

- **Pilot Change:** STOP-Bang Screening Tool (Chung et al, 2008) One month pilot for orthopedic patients

- **Decision:** Incorporate Tool as preoperative assessment and postoperative physician order set.

- **Widespread Implementation with Monitoring of Outcomes:** Educational competency for perioperative nurses and anesthesiologists. Comparative evaluation of critical events prior OSA tool and post implementation.

- **Dissemination of Results:** Three month comparative data before and after STOP-Bang Tool.
Communication Process

• Preoperative Nurse: conducts STOP-Bang assessment
• Phone interview
• If needed: complete neck circumference & BMI (DOS).
• Inform Anesthesiologist if high risk
• Anesthesiologist determines validation
• High risk: OSA Physician order set completed
• OSA green label on front of patient chart
Organizational Assessment/ Readiness for Change

UPMC Shadyside: Shared Leadership Councils

Promote Quality and Practice Change with EBP

Communicate Results of Need for EBP Practice Change

Clear and Concise Education Sessions for Staff Preparation

End Result: Staff Understands and Accepts the EBP Change

Enhanced Patient Outcomes and Satisfaction
Barriers/Challenges for OSA Project

- **Time Management**
  - Schedule time wisely
  - Allow ample time for setbacks

- **Staff “Buy In”**
  - Key Component Education
  - Mandatory Education Sessions
  - Data analysis lengthy: Request assistant
## OSA Project Outcomes & Evaluation

**STOP-Bang Scoring Model**

<table>
<thead>
<tr>
<th>Electronic Health Record</th>
<th>Postoperative Physician Order Set</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print on Demand</td>
<td></td>
</tr>
</tbody>
</table>

**Evaluation**

<table>
<thead>
<tr>
<th>Compare improvements in quality of care prior to and post OSA screening</th>
<th>Staff competency</th>
</tr>
</thead>
</table>

**Nursing Staff Questionnaire**

<table>
<thead>
<tr>
<th>Evaluation process</th>
<th>Assess for process improvement</th>
</tr>
</thead>
</table>
Set Backs/ Adversity of OSA Project

• Time issues:
• Chart review for evaluation of QI project.
• Request for assistance with chart review is limited.
• Collaboration of team members to complete tasks: Staff work load minimal mandates time for additional projects.

• **Solution: Time Management:** Be Patient but persistent and allow for additional time for project.
Components of Organizational Change

• **Clear communication of vision and plan:**
  • All department directors of Shadyside Hospital acknowledge need for OSA screening tool.
  • Timeline for OSA project approved.
  • OSA Policy and Procedure development for adherence to standards of revised practice.
Strategies to Overcome Barriers

- Foster respect amongst team members.
- Understand need for time delays as result of added work load due to economy.
- Professional relationships among team members: prove effective with encouragement and understanding of need for practice change.
Resources: Human & Financial

• Expert Staff utilized for critique of Literature Review: Chief Anesthesiologist, QI Director, Electronic Health Record staff, Advanced Practice Nurse.

• QI IRB Exempt: permission to review patient records to compile data for comparison evaluation.

• Financial: No financial assistance has been required to date.
# STOP-Bang Scoring Model

**The STOP-Bang OSA Screening Tool Assessment/Follow-up with Anesthesia**

Answer Yes or No to each question and place an “X” in the corresponding box.

**Questions:**

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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6. **Age:** > 50 yr. Old?

7. **Neck Circumference:** > 17 in. or 40 cm.?

8. **Gender:** Male gender

**Total for Yes:**  

The patient is at high risk for OSA if they answered **yes to three or more** items.
The patient is at low risk for OSA if they answered **yes to less than three** items.

**Alert Anesthesia if patient is at high risk:** Yes:† No:†

Anesthesiologist will determine proper postoperative guidelines.

Anesthesiologist Signature: ________________________________

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Chung et al, (2008)
**Postoperative Plan**

**Postoperative Physician Order Set:**

- Consult respiratory therapy postoperative oxygen requirements: maintain oxygen saturation >90%. Consider CPAP, BIPAP.

- Notify physician if unable to maintain sao2 >90%.

- Consult medical physician regarding follow-up for formal sleep study.

- Postoperative nurse OSA discharge education protocol: OSA patient education channel, instruct need for formal sleep study as prescribed.

- Continuous pulse oximeter and cardiac monitor for 24 hours postoperative or until intravenous opioids are discontinued.

- **The OSA order is located in the PACU postoperative order set in the Electronic Health Record.**
Teaching Methods for Perioperative Staff

- 20 minute lecture with power point presentation.
- Return demonstration: staff will partner-up and perform STOP-Bang Screening Tool.
- Review postoperative physician order set for OSA.
- Complete competency: ensure staff understanding of OSA program.
- Total program: 1 hour
Comparison of Obstructive Sleep Apnea Patients Before and After STOP-Bang Scoring Model

Number of Patients Labeled As OSA

Before STOP-Bang

n=124

3%

14% Increase

STOP-Bang

n=143

17%

January

February
<table>
<thead>
<tr>
<th></th>
<th>January N=124</th>
<th>February N=143</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naloxone</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Condition C</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Condition A</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>
Postoperative OSA Patient Care

• PACU nurse monitors closely
• Outpatient: monitored 4 hours (PACU+DAS)= 4hrs
• High risk OSA: continuous pulse oximeter & LLM for 24 hours or until iv opioids are d/c.
Discovery 8/08 – 10/09
- Literature review
- Expert approval
  Anesthesiologist
  QI Director
- QI IRB exempt

Planning 3/09 – 3/11
- STOP-Bang
  Print on Demand
  template 3/09
- Physician order
  set 11/09
- Education
  process 1/10
- Repeat 3/11
- STOP-Bang
  pilot 1/10-2/10

Implementation 6/30/11
- OSA
  Awareness Day
- Quality award
- STOP-Bang
  surgical scoring
  model 9/15/11
- Inaugural OSA
  System wide
  meeting

Evaluation Futuristic
- Comparison
  analysis 3
  months pre &
  post
- STOP/Bang
- Staff
  evaluation
  5/1/11
Moving Forward

**Hot Topic:** My focus has received much attention

Collaboration with Sleep Director and UPMC home equipment  OSA home sleep monitor testing

**Nursing education:** focus vigilant respiratory assessment  for vulnerable OSA patient
Conclusion

Team Effort
- EBP guidelines
- Patient Advocacy
- Safe Postoperative Outcomes
Take Home Message

- If you have a burning question, a desire, or even a thought...
- Don’t put it on the back burner.
- Live it and breathe it.
- In a shared leadership environment,
  – Great Things Happen!
  – Thank You.
References


