Know your tools: Improving the effectiveness of nurses using the confusion assessment method (CAM) to detect delirium

Julie Plagenshoef, MPH, RN, CMSRN
Preparing for Improvement: Why Delirium?

- Increases patient mortality
- Increases patient morbidity before and after hospitalization
- Increases patient and family distress
- Increases length of stay in hospital

Change Management CAP: Change Acceleration Process

**Leading Change**

- Creating a Shared Need
- Shaping a Vision
- Mobilizing Commitment
- Making Change Last
- Monitoring Progress

**Changing Systems & Structures**

- Current State
- Transition State
- Improved State
Preparing for Improvement Using CAP

• Shaping a vision
  – Hospital Goals – CESP
  – Unit Goals – patient safety and experience

• Mobilizing commitment
  – Unit manager, staff RNs, PPLs, staff educators, data experts
Assessment: The State of the CAM

• Baseline data
  – Completeness of CAM assessments
  – Reliability of CAM assessments

• Knowledge survey
  – Gaps and strengths
  – Barriers to completion and reliability

• Available resources
  – Time, money, staff coverage
Diagnosis: What Needs to Change?

• Aim of project:
  – Change practice to improve effectiveness of nurses using the CAM to detect delirium by increasing completeness of the tool and enhancing assessment of its features and outcome (reliability)
Planning: How to Improve?

- Best practices for RN education to improve completeness and reliability
  - Predisposing: One hour discussion sessions, case vignettes
  - Enabling: Flow sheets, champions
  - Reinforcing: Feedback, pop-ups, re-train

Planning: How to Improve?

- **Methods overview**
  - Knowledge survey results inform targeted education
  - Paired CAM assessments of staff/expert RNs to assess reliability
  - Chart audit to assess completeness

- **Test period**
  - 2.5 weeks to complete education sessions

- **Outcomes measured**
  - % completeness of CAM assessments
  - Inter-rater reliability
Intervention: Implement Improvement Plan

• Knowledge survey
  – 18 questions – e.g., what is the CAM, how do you assess each feature, what are biggest barriers to using it?
  – 23/34 (68%) RNs eligible for training responded

• Survey showed need for:
  – Review of expectations (74% correct)
  – Review of features (60-91% correct)
  – Using CAM for TBI patients (30% listed as barrier)
## Evaluation: Patient Demographics Pre/Post Training

<table>
<thead>
<tr>
<th></th>
<th>Pre-Training</th>
<th>Post-Training</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Total Patients</td>
<td>39</td>
<td>-</td>
<td>39</td>
</tr>
<tr>
<td>Total Assessments</td>
<td>139</td>
<td>-</td>
<td>117</td>
</tr>
<tr>
<td>Average Age</td>
<td>50</td>
<td>-</td>
<td>51</td>
</tr>
<tr>
<td>Sex</td>
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<td></td>
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<tr>
<td>Males</td>
<td>28</td>
<td>71.8</td>
<td>21</td>
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<tr>
<td>Females</td>
<td>11</td>
<td>28.2</td>
<td>18</td>
</tr>
<tr>
<td>Mech of Injury</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Falls</td>
<td>11</td>
<td>28.2</td>
<td>12</td>
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<tr>
<td>MVC/MCC</td>
<td>10</td>
<td>25.6</td>
<td>10</td>
</tr>
<tr>
<td>Assault</td>
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<td>7.7</td>
<td>0</td>
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<tr>
<td>Other</td>
<td>16</td>
<td>41.0</td>
<td>17</td>
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<tr>
<td>Brain Injury</td>
<td>7</td>
<td>17.9</td>
<td>8</td>
</tr>
</tbody>
</table>
Evaluation of CAM Completeness Pre/Post Training

Percent CAM Assessments Complete

Pre-Training: 73%
Post-Training: *85%

*Z= 2.36, p=0.009
Evaluation of Inter-Rater Reliability Pre/Post Training

Overall CAM Agreement

- Pre-Training: 84%
- Post-Training: *97%

*Kappa = 0.059, p = 0.102
Follow-up knowledge survey 1 year later
- 16/36 (44%) RNs responded, 4/16 (25%) new hires
- Strengths:
  - Understanding CAM features (81-100% correct)
  - Risks for delirium (94% correct)
  - Feeling comfortable using CAM (94% correct)
- Gaps:
  - Using CAM for TBI patients (50% listed as barrier)
Evaluation of CAM Completeness at One Year

Percent CAM Assessments Complete

<table>
<thead>
<tr>
<th></th>
<th>Pre-Training</th>
<th>Post-Training</th>
<th>Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAM Complete</td>
<td>73%</td>
<td>85%</td>
<td>90%</td>
</tr>
</tbody>
</table>
Evaluation of Inter-Rater Reliability at One Year

CAM Agreement, Overall and by Type of Injury

Pre-Training | Post-Training | Follow-up
---|---|---
Brain Injured | Non-Brain Injured | Overall
70% | 89% | 100%
88% | 100% | 97%
58% | 83% | 100%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Pre-Training  Post-Training  Follow-up
Brain Injured  Non-Brain Injured  Overall
Evaluation: What the Data Show

• Effectiveness of intervention
  – Completeness and reliability of CAM assessments increased post-training
  – One year later completeness was maintained but overall reliability decreased

• Opportunities for improvement
  – Increase reliability for TBI patients
  – Provide education reinforcement
## Sustainability: Cost Analysis

<table>
<thead>
<tr>
<th>Cost Description</th>
<th>Implementation Cost</th>
<th>Sustainability Cost</th>
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</thead>
<tbody>
<tr>
<td>Staff RN education hours (34 RNs, 40 min education, $51.20/hr)</td>
<td>$1,160.53</td>
<td>Ed Day New Hires</td>
</tr>
<tr>
<td>Staff educator hours (1 presenter, 2 covering floor, $51.20/hr)</td>
<td>$2,150.40</td>
<td>Ed Day New Hires</td>
</tr>
<tr>
<td>Chart auditing (12 hrs, $51.20/hr)</td>
<td>$614.40</td>
<td>Repeat 1x/year</td>
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<tr>
<td>CAM accuracy verification (2 PPLs, 10 hours)</td>
<td>Fixed Cost</td>
<td>Evaluate Need</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$3,925.33</strong></td>
<td></td>
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</tbody>
</table>
• Delirium increases length of stay (LOS) by 4-10 days (Ely, et al., 2001)
  – $2500/day = $10,000 to $25,000 cost
• Early recognition and intervention can decrease LOS by 4-10 days (Maldonado, et al., 2008; Lundstrom, et al., 2007)
• Cost avoidance of $10,000- $25,000
Next Steps

• Present follow-up data to 13A staff
• Incorporate into continuing education
• Incorporate into new staff orientation ✔
• Periodic chart audits?
• Improve patient care outcomes (e.g., decrease length of stay, decrease fall rates)
  – Prevention - Let’s stop delirium!
  – Interventions
Limitations

• Challenges of linking CAM+ assessments with delirium diagnoses

• Little definitive evidence for effectiveness of intervention strategies

• Resource constraints
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References


