Conflict of Interest Disclosure

- Conflicts of Interest for ALL listed contributors.
  - Study was funded by ASPMN.
  - No other conflicts of interest.

A conflict of interest is a particular financial or non-financial circumstance that might compromise, or appear to compromise, professional judgment. Anything that fits this should be included. Examples are owning stock in a company whose product is being evaluated, being a consultant or employee of a company whose product is being evaluated, etc.


Conflict of Interest Disclosure

- Authors Conflicts of Interest;
  - A. Joanne G Samuels – Funding from ASPMN
  - No other conflicts of interest

The impact of assessment and reassessment documentation on the trajectory of pain severity: A pilot study
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Associate Professor
University of New Hampshire

Generously funded by ASPMN
Introduction

- The Joint Commission standards implemented in 2001 accomplished the following:
  - Established that patients have a right to adequate pain management
  - Ensured hospitals adopted a system where pain was addressed
  - Changed the paradigm of accountability for pain management from the individual practitioner to the organization
  - The practice environment impacts care/outcomes (Aiken, 2002)

- Multiple resources are expended in attempts to meet and maintain Joint Commission pain management standards:
  - Documentation entries by staff
  - Data retrieval to measure standards compliance
  - The presentation of pain management documentation (PMD) as the chief data source for measuring the quality of pain care has been transformed by the adoption of the electronic record.
  - PMD chronicles the pain assessment, treatment, and patient response.
    - Assessment
    - Intervention
    - Reassessment

- The electronic medical record documentation output provides an opportunity to:
  - Capitalize on the repeated measure aspect of the data presentation
  - Capture 100% of a population
  - Create research variables for hypothesis testing
The Electronic Health Record

Structured and unstructured fields

Typically hospital staff are provided with templates to individualize

Introduction

- With a strong base in quality improvement studies and the adoption of the EHR, we can now begin to ask which organizational factors contribute to effective pain management outcomes?
- Policies differ
- Electronic record platforms differ
- Formularies differ
- Etc.

Introduction

- A need for organizational comparative effectiveness research exists...
- Relatively untapped in the field of organizational pain management
- Requires the use of multilevel modeling procedures to statistically sort out factors affecting pain management
- The EHR provides an opportunity to look at repeated measures data for growth modeling
Introduction

- Comparative effectiveness research in organizational pain management needs to
- Methodologically accommodate levels of complexity within the hospital system
- Consider the differences in electronic health record platforms
- Capitalize on the repeated measures capability of the electronic health record output to begin to look at outcomes other than the MEAN or average pain severity scores

Study Purpose

- Therefore…. A pilot study was conducted to examine methodological issues that arise when conducting comparative effectiveness research in pain management that incorporates the use of a multilevel model design, and repeated measures output such that occurs from the electronic health record

The research question

What is the impact of pain assessment and reassessment documentation on postoperative pain severity trajectory?
Research aims

- 1. Describe the patients’ pain severity trajectory
- 2. Identify the between-patient predictors that impact the pain severity trajectory
- 3. Identify the impact of routine assessment and reassessment on the pain severity trajectory

Theoretical Framework
Theory of Symptom Management

Permission for use requested (Dodd et al., 2001)

Levels of pain management in hospitals:
Nested data
With-in patient - Level 1

- Pain severity trajectory is a line
  - Intercept or baseline score - the start of the line
  - Slope – represents the rate of change

Between patient – Level 2

- Patient demographics
- Type of surgical procedure
- Use of pain management technologies (PCA, EO) or blocks
- Nursing care processes of assessment and reassessment
Practice setting – Level 3

- Place where care occurs
- Hospital type
- Unit type
- Presence of pain management resource teams
- Involved anesthesia group
- Etc.

Study Methods

- Multilevel modeling study design
- Setting: Three 100 to 200 bed New England community hospitals
- Record Review using three different computer platforms
- Pain management policies and procedures were obtained

Patient Record Sample

- Criteria for inclusion
  - Adult patient with a general surgical procedure: orthopedic, general, gynecology or laparoscopic
- Criteria for exclusion
  - Cardiac surgery
  - Intensive care unit stay
Procedures

- University and Hospitals' IRB approval
- Computer training and confidentiality procedures
- Required the use of paper charts and EHR access
- Admission to discharge PMD data abstraction

<table>
<thead>
<tr>
<th>History and physical</th>
<th>Preoperative notes</th>
<th>Nurses post operative documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medication reconciliation</td>
<td>Anesthesia</td>
<td>Flow sheets</td>
</tr>
<tr>
<td>Discharge summary</td>
<td>Nurses' operative notes</td>
<td>Medication administration records</td>
</tr>
<tr>
<td>Physician progress notes</td>
<td>PACU notes</td>
<td></td>
</tr>
</tbody>
</table>

Data Analysis: Multilevel modeling

- Also known as hierarchical or mixed effect modeling, MLM accommodates data occurring at different hierarchical levels
- Researchers support its use for organizational hypothesis testing
- Covariates are described as either time variant or time invariant

Time variant

Data collection instrument
Descriptive Results

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>146</td>
<td></td>
</tr>
<tr>
<td><strong>Females</strong></td>
<td>99(68)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
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<tr>
<td>White</td>
<td>140(95.8)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>6(4.2)</td>
<td></td>
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<tr>
<td><strong>Surgical Type</strong></td>
<td></td>
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<tr>
<td>General</td>
<td>69(44)</td>
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<tr>
<td>Orthopedic</td>
<td>53(34)</td>
<td></td>
</tr>
<tr>
<td>Gynecologic</td>
<td>23(15)</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>61.6(14.9)</td>
<td>23-95</td>
</tr>
<tr>
<td><strong>Body Mass Index</strong></td>
<td>30.42(7.4)</td>
<td>17.8-55.9</td>
</tr>
<tr>
<td><strong>Number of comorbid conditions</strong></td>
<td>3.7(1.5)</td>
<td>0-12</td>
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<tr>
<td><strong>Number of previous surgeries</strong></td>
<td>2.85(2.4)</td>
<td>0-16</td>
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<tr>
<td><strong>PCA/PCEA use</strong></td>
<td>73(50)</td>
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<tr>
<td><strong>Incision type</strong></td>
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<tr>
<td>Laparoscopic</td>
<td>48(32.9)</td>
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</tr>
<tr>
<td>Open</td>
<td>99(63.7)</td>
<td></td>
</tr>
<tr>
<td>Missing data</td>
<td>5(3.4)</td>
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<tr>
<td><strong>Length of stay (hours)</strong></td>
<td>77.3(38.4)</td>
<td>14.8-215.0</td>
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<tr>
<td><strong>NRS Mean by patient</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine Assessment percentage</td>
<td>0.94(0.34)</td>
<td>0.07-100</td>
</tr>
<tr>
<td>Reassessment percentage</td>
<td>0.36(0.17)</td>
<td>0.06-0.78</td>
</tr>
<tr>
<td>Mean initial status</td>
<td>3.25(2.7)</td>
<td>0-10</td>
</tr>
<tr>
<td>Slope</td>
<td>-0.01(0.05)</td>
<td>-0.6-.12</td>
</tr>
</tbody>
</table>

Results: Aim 1

Describe the pain severity trajectory

Results: Aims 2 and 3

Prototypical Change Trajectories Displaying Fitted Growth Curves for Patients of Average Age and Number of Illnesses without Laparoscopic Surgery at Hospital’s 1st Orthopedic and Non-Orthopedic Patients with High and Low Reassessment percentages controlling.
Results: Aim 3

- The final model was significant in explaining variation in the reported pain scores as a result of standards adherence.
- While routine assessment failed to significantly impact the intercept or slope, reassessment after intervention resulted in a favorable, though small, rate of pain change, resulting in a -0.03 ($p = .01$) change over time.
- Approximately 37.5% of the variance of the PST was explained by between-patient level characteristics, leaving approximately 63% of the model of postoperative PST left unexplained.

Discussion

- Wide variation in the pain experience
  - Differences in baseline pain
  - Differences in pain resolution
- Older patient and those with laparoscopic procedures reported lower baseline pain, but not a more shorter pain duration
  - Results more precise than mean pain scores
- Older patients with more comorbid conditions and orthopedic surgery had a less favorable pain resolution

Discussion

- Routine assessment is at a high level of adoption at the study facilities
- Reassessment 1 hour after intervention was at a low level of adherence despite the fact that it was associated with a more favorable pain severity trajectory.
  - Weak association – although important finding
  - Many methodological limitations using the raw reassessment data
- Large unexplained portion of the model substantiates the need for organizational research
Limitations

- Reassessment taxonomy and location
- Convenience sample
- Data management for large datasets collected by hand

Implications

- Inconsistent reassessment fields posed the most significant measurement threat to validity, supporting the need for cross organizational streamlining
- Statisticians knowledgeable in MLM techniques, informatics technology specialists, and nurses expert in pain management are needed for the research team.
- The ability to create variables for hypothesis testing with repeated measures data can help advance the science of organizational pain management

Conclusions

- Repeated measures output provided for a more clinically relevant outcome measure of the pain experience
- Electronic output could be reformulated into research variables for hypothesis testing
- Comparative effectiveness research is warranted
Future research

- Multihospital research could help identify best practices and provide evidence on which to base policy decisions
- The 'dose' of assessment and reassessment requires investigation
- Organizational factors that promote positive pain management outcomes need to be identified

Thank You

- Manuscript: