Development and Psychometric Evaluation of a New Clinical Pain Knowledge Test for Nurses

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Conflict of Interest Disclosure

Authors' Conflicts of Interest

- E. Bernhofer, Speaker’s Bureau for Mallinckrodt Pharmaceuticals - honorarium
- B. St. Marie, Advisory Board for CO/PE REMS, Board of Directors – American Pain Society, Funding through National Institute On Drug Abuse, K23 DA043049-01.

Objectives

The participants will be able to
1. Identify the current state of pain management knowledge among post-licensure clinical nurses today.
2. Discuss the process of developing a valid tool/test to measure the pain management knowledge of post-licensure nurses.
3. Describe the psychometric properties of an instrument designed to measure pain management knowledge of post-licensure nurses based on core competencies for pain management.
Background

- The complex nature of pain underscores the need for pain education and a measurement of understanding that reflects core competencies and changes in the co-morbidities of hospitalized patients.
- Gap: No validated pain knowledge test existed to
  1. Measure post-licensure clinicians' knowledge of pain management in the current complex patient population (more chronic pain, substance use disorder, opioid tolerance, and acute on chronic pain).
  2. Test knowledge of pain management within the core competency domains.

Purpose

- To develop and test the psychometric properties of a new Clinical Pain Knowledge Test
- This tool will fill a gap that exists in the ability of hospital leadership, educators, and researchers
  1. To clearly measure the pain management knowledge of post-licensure hospital-based clinicians
  2. To inform on the need for pain management education and subsequent outcomes of education initiatives.

Methods

- Prospective design
  - Survey of practicing RNs to determine psychometric properties of new test
  - Use education standards for knowledge test construction and evaluation
Methods

Content validity of the initial 36-item test.

- Process of expert input

- Back and forth

- Final outcome: Content validity of initial 36-item test ‘very good’ (95.1% agreement)

Methods

Recruitment

- Full and part-time Registered Nurses

- Employed by four large Midwestern United States hospitals

- Fluent in English (test written in English)

- Able to access a web-based test through a link

- Time period: between August 2015 and April 2016

Methods

Emails contained

- Description of the study

- Invitation to participate were sent to all full and part-time Registered Nurses employed at four large Midwestern health centers

- Link to the test
Sample test question
Deciding how much analgesic medication a patient needs is based on:
   a. the provider’s approved order set
   b. the individual patient’s subjective response to analgesic dosing
   c. the 0 to 10 pain scale
   d. the level of emotion displayed by the patient

Sample test question
When a post-surgical patient has a risk for relapse of previous substance use disorder, the discharge plan for safety while taking opioids for pain at home would include:
   a. establishing a safe medication treatment plan that includes opioid monitoring
   b. telling them to only take the opioids when their pain is severe
   c. calling their sponsor from AA or NA to let them know about the opioids for pain
   d. not sending the patient home with opioids in this situation; other analgesics should be prescribed
Sample characteristics (N = 747)

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Mean</th>
<th>Range</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43.25</td>
<td>16.13</td>
<td>12.9</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Years as registered nurse</th>
<th>Mean</th>
<th>Range</th>
<th>SD</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>16.13</td>
<td>1 - 48</td>
<td>12.9</td>
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</table>

<table>
<thead>
<tr>
<th>Highest Nursing Education Level</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diploma</td>
<td>45 (6.0)</td>
</tr>
<tr>
<td>ADN</td>
<td>187 (25.0)</td>
</tr>
<tr>
<td>BSN</td>
<td>446 (62.4)</td>
</tr>
<tr>
<td>MSN</td>
<td>47 (6.3)</td>
</tr>
<tr>
<td>Doctorate</td>
<td>2 (0.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary work area</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical/Surgical</td>
<td>225 (30.4)</td>
</tr>
<tr>
<td>Intensive Care Units</td>
<td>94 (12.5)</td>
</tr>
<tr>
<td>Critical</td>
<td>54 (7.2)</td>
</tr>
<tr>
<td>Emergency/trauma</td>
<td>50 (6.7)</td>
</tr>
<tr>
<td>Orthopedics</td>
<td>44 (5.9)</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>44 (5.9)</td>
</tr>
<tr>
<td>Other</td>
<td>39 (5.2)</td>
</tr>
</tbody>
</table>

Results

- Completed tests that met analysis criteria, N=747

- Initial mean test score, 69.4% correct (range 27.8-97.2)
  - Revision/removal of 13 unacceptable questions, mean test score, 50.4% correct (range 8.7-82.6)

Results (continued)

- Initial test item % difficulty range, 15.2% -- 98.1%; discrimination values range, 0.03 -- 0.50

- Final test item % difficulty range, 17.6-91.1%; discrimination values range, -0.04-1.04

- Split-half reliability final test, 0.66

- High decision consistency reliability: test cut-score of 75%
Participation

- Nurse-participants N=1423; completed test N=750 (53%)
- The mean correct score (69%) on the initial test indicated a moderate level of overall difficulty
- Test was too long? Too difficult?

Association between Total Score and Domain Scores on the final 23-item Clinical Pain Knowledge Test with Number of pain course hours a nurse reported taking (n = 715*)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Diploma (n=45)</th>
<th>ADN (n=186)</th>
<th>BSN (n=466)</th>
<th>MSN/Doctorate (n=49)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge Application</td>
<td>3±[2,3]</td>
<td>2±[2,3]</td>
<td>3±[2,3]</td>
<td>3±[2,3]</td>
<td>0.006</td>
</tr>
</tbody>
</table>

1: Significantly different from Diploma
2: Significantly different from ADN
3: Significantly different from BSN
4: Significantly different from MSN/Doctorate
1-3: Significance level of 0.008 was used for pairwise ad-hoc comparisons.
Challenges

- Recruitment
- Expertise of nurses
- Changing world of hospitalized patients

Psychometrics Conclusions

- Final 23-item Clinical Pain Knowledge Test (CPKT)
  - Satisfactory validity and reliability
  - Included four domains: core competencies of pain management.
    1) multidimensional nature of pain
    2) pain assessment and measurement
    3) management of pain
    4) context of pain management

Implications and More-to-Come!

- Future: evolving nature of the essential knowledge in the era of scrutiny when opioids are used for pain (Bowell et al., 2016; American Nurses Association and American Society for Pain Management Nursing, 2016).
- Studies are needed to validate this test in interdisciplinary populations: physicians, physical therapists and pharmacists
- Periodic updates/revisions will be needed as new information and knowledge needs change over time
THANK YOU