Pain Management in Nursing Homes

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Acknowledgements

- Faculty Project Advisor: Donna Hamby DNP, RN, APRN, ACNP-BC
- Statistician: Richard E. Gilder, RN-BC, MS
Background

- Universal human experience - 5th vital sign (McCaffery, 1999)
- Pain management – a national epidemic (IOM, 2011)
  - Leading cause of disability
  - Annual cost = $ 635 billion
  - Affects > 100 million adults in the U.S., mostly elderly
  - 1.4 million older adults reside in nursing homes
  - Over 85% of nursing home residents experience pain regularly (Atkinson, 2013)
  - Pain under-assessed, under-treated, under-managed in nursing homes (Parker, 2013)
Gap Analysis

- Hydrocodone changed to Schedule II on October 6, 2014
- Challenge for healthcare providers in nursing homes
- Patients transferred from other healthcare facilities without triplicates for Schedule II medications.
- Pharmacist unable to dispense Sch II Rx without a triplicate
- Physicians make 1 or 2 visits to nursing homes per week
- Patients suffer until seen by their physician
- Pain protocol using Buprenorphine Transdermal System (BTDS)
Pharmacokinetics and pharmacodynamics of BTDS

- Buprenorphine – semisynthetic opioid
- Partial $\mu$ and $\delta$ receptor agonist
- Partial $\kappa$ receptor antagonist
- Half-life of 32 hours – sustained analgesia
- Metabolized in liver and primarily excreted in feces

(Pergolizzi et al., 2015)

Randomized controlled trials (RCTs)

Non-RCTs, longitudinal, observational studies

Somatic, nociceptive, neuropathic, cancer pain, mixed pain

Efficacy, tolerability, and safety of BTDS
Literature Review

- **Therapeutic Efficacy**
  - Statistical significant result for BTDS patch compared to Hydrocodone, Oxycodone, MS Contin, Percocet, and Fentanyl patch (Leng et al., 2015; Gordon et al., 2010; Steiner et al., 2011, Miller et al., 2013)

- **Tolerability**
  - Fewer nausea, vomiting, and constipation.
  - Minimal withdrawal effect and adverse site reaction (Ripa et al., 2012; Wolff et al., 2012; Conaghan et al., 2011)

- **Safety**
  - No dosage adjustment needed in elderly
  - Ceiling effect for respiratory depression at lower dosages
  - No potential for drug abuse
  - Suitable for renal impairments and hemodialysis (Mitra et al., 2013; Pergolizzi et al., 2015)
The IOWA Model of Evidence-Based Practice

- Dr. Marita Titler, 1994
- Assessment of problem
  - Clinical versus knowledge deficit issue
- Priority for organization
- Review of literature
- Synthesize and critique findings
- Conduct pilot study
- Appraise the feasibility to implement results
- Implement the change
- Evaluate the outcomes
In nursing home patients admitted with moderate to severe pain, what is the effect of a pain protocol compared to the usual standard of care on pain scores during a four-month period?
Methods

❖ **Project Design**
  ➢ Pre-test, intervention, and post-test design
  ➢ Pain scores for admission, 48 hours, 72 hours, week 1, week 2, and week 3 were compared and analyzed.

❖ **Setting**
  ➢ Nursing home
  ➢ Non-probability sample of convenience

❖ **Population**
  ➢ **Inclusion Criteria:** Patients requiring Sch II pain Rx with moderate to severe pain
  ➢ **Exclusion Criteria:** COPD, ILD, neuropathy, cancer patients
Tool

- Internal consistency with Cronbach’s α coefficients from 0.85 to 0.89.
- Test-retest reliability ranged from 0.57 to 0.83
- Scales were found to be valid according to the factor analysis (Herr, Spratt, Mobily, & Richardson, 2004).
Data Collection

Nurses assess for pain

Pain ≥ 5 and/or patient requests Sch II meds?

Yes

Apply BTDS 5 mcg/hr and use Tramadol/Tylenol # 3 prn

No

Use adjunct pain medication (Tramadol/Tylenol # 3) if needed

Physician/NP assess pain

Is pain adequately relieved with BTDS?

Yes

Continue current dosage of BTDS

No

Physician/NP/Nurses re-assess pain

Does pt want to try higher dose of BTDS?

Yes

Titrate BTDS by 5 mcg/hr up to 20 mcg/hr max

No

Start on Sch II medication
Data Collection

- Nurses recorded the pain scores in the electronic health record (EHR) every shift and every time a pain medication was given.
- Patient’s unique ID, age, gender, ethnicity, diagnosis, and pain scores were recorded in the Excel Spreadsheet.
- Patients were divided into two broad categories – chronic pain group and post-operative pain group.
- Information transferred to Statistical Package for the Social Science (SPSS) for data analysis.
Data Analysis

- Descriptive statistics such as frequency, mean, median, range, and standard deviation were used to compute age and pain scores.
- Non-parametric Independent Samples Kruskal-Wallis test was used to determine the significance of difference between the pain scores.
- Post-hoc analysis was conducted to analyze the statistical difference among the various pain scores.
- The level of significance was set at 0.05 (95%).
- All analyses were performed for total sample, chronic pain group, and post-operative pain group.
Results

Total Sample: 94
Chronic Pain: 53
Post-Operative Pain: 41
## Results

<table>
<thead>
<tr>
<th>Maximum BTDS Dosage</th>
<th>Frequency (Patients)</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mcg/hr</td>
<td>3</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td>10 mcg/hr</td>
<td>73</td>
<td>77.7</td>
<td>77.7</td>
<td>80.9</td>
</tr>
<tr>
<td>15 mcg/hr</td>
<td>18</td>
<td>19.1</td>
<td>19.1</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Frequency of maximum dose of BTDS used**

<table>
<thead>
<tr>
<th>BTDS Titrated at</th>
<th>Frequency (Patients)</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>48 hrs</td>
<td>62</td>
<td>66</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>48 hrs and 1 week</td>
<td>13</td>
<td>13.8</td>
<td>13.8</td>
<td>79.8</td>
</tr>
<tr>
<td>48 hrs and 72 hrs</td>
<td>4</td>
<td>4.3</td>
<td>4.3</td>
<td>84.1</td>
</tr>
<tr>
<td>72 hrs</td>
<td>10</td>
<td>10.6</td>
<td>10.6</td>
<td>94.7</td>
</tr>
<tr>
<td>72 hrs and 2 week</td>
<td>2</td>
<td>2.1</td>
<td>2.1</td>
<td>96.8</td>
</tr>
<tr>
<td>None</td>
<td>3</td>
<td>3.2</td>
<td>3.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Titration of BTDS at various points on timeline**
Results

Frequency of Adjunct Pain Medications Used
Results

Total Sample

Hypothesis Test Summary

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Test</th>
<th>Sig.</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>The distribution of PAIN.Score is the same across categories of Score Group.</td>
<td>Independent-Samples Kruskal-Wallis Test</td>
<td>.000</td>
<td>Reject the null hypothesis.</td>
</tr>
</tbody>
</table>

Asymptotic significances are displayed. The significance level is .05.

Total N | 564
---|---
Test Statistic | 472.154
Degrees of Freedom | 5
Asymptotic Sig. (2-sided test) | .000

1. The test statistic is adjusted for ties.
Results

Chronic Pain Group

Hypothesis Test Summary

<table>
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<tr>
<td>1. The distribution of PAIN SCORE is the same across categories of Score Group.</td>
<td>Independent-Samples Kruskal-Wallis Test</td>
<td>.000</td>
<td>Reject null hypothesis</td>
</tr>
</tbody>
</table>

Asymptotic significances are displayed. The significance level is 0.05.

Independent-Samples Kruskal-Wallis Test

<table>
<thead>
<tr>
<th>Score Group</th>
<th>PAIN SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admit-Pain Score</td>
<td>6.00</td>
</tr>
<tr>
<td>Pain Score in 48 hrs</td>
<td>7.00</td>
</tr>
<tr>
<td>Pain Score in 72 hrs</td>
<td>7.00</td>
</tr>
<tr>
<td>Pain Score in Week 1</td>
<td>7.00</td>
</tr>
<tr>
<td>Pain Score in Week 2</td>
<td>7.00</td>
</tr>
<tr>
<td>Pain Score in Week 3</td>
<td>7.00</td>
</tr>
</tbody>
</table>

Total N: 318

Test Statistic: 268.337
Degrees of Freedom: 5
Asymptotic Sig. (2-sided test): .000

1. The test statistic is adjusted for ties.

Pairwise Comparisons of Score Group

Each node shows the sample average rank of Score Group.

<table>
<thead>
<tr>
<th>Sample1-Sample2</th>
<th>Test Statistic</th>
<th>Std. Error</th>
<th>Std. Test Statistic</th>
<th>Sig.</th>
<th>Adj. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Score in Week 3 Pain Score in Week 2</td>
<td>14.649</td>
<td>17.527</td>
<td>0.847</td>
<td>.387</td>
<td>1.000</td>
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<tr>
<td>Pain Score in Week 3 Pain Score in Week 1</td>
<td>78.491</td>
<td>17.527</td>
<td>4.364</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 3 Pain Score in 48 hrs</td>
<td>113.034</td>
<td>17.527</td>
<td>6.473</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 3 Pain Score in 72 hrs</td>
<td>165.686</td>
<td>17.527</td>
<td>9.437</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 3 Pain Score in 72 hrs Admit-Pain Score</td>
<td>252.934</td>
<td>17.527</td>
<td>13.271</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 2 Pain Score in Week 1</td>
<td>61.942</td>
<td>17.527</td>
<td>3.517</td>
<td>.000</td>
<td>0.000</td>
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<tr>
<td>Pain Score in Week 2 Pain Score in 48 hrs</td>
<td>98.745</td>
<td>17.527</td>
<td>5.606</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 2 Pain Score in 72 hrs</td>
<td>159.547</td>
<td>17.527</td>
<td>8.599</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 2 Pain Score in 72 hrs Admit-Pain Score</td>
<td>217.755</td>
<td>17.527</td>
<td>12.424</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 1 Pain Score in Week 1</td>
<td>38.804</td>
<td>17.527</td>
<td>2.080</td>
<td>.037</td>
<td>0.801</td>
</tr>
<tr>
<td>Pain Score in Week 1 Pain Score in 48 hrs</td>
<td>68.006</td>
<td>17.527</td>
<td>5.072</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in Week 1 Pain Score in 72 hrs</td>
<td>156.113</td>
<td>17.527</td>
<td>8.597</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in 72 hrs Pain Score in 48 hrs</td>
<td>62.302</td>
<td>17.527</td>
<td>2.984</td>
<td>.003</td>
<td>0.635</td>
</tr>
<tr>
<td>Pain Score in 72 hrs Pain Score in 72 hrs Admit-Pain Score</td>
<td>119.939</td>
<td>17.527</td>
<td>6.619</td>
<td>.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Pain Score in 48 hrs Pain Score in 72 hrs Admit-Pain Score</td>
<td>67.208</td>
<td>17.527</td>
<td>3.634</td>
<td>.000</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is 0.05.
Results

Post-Operative Pain Group

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<td>Reject the null hypothesis</td>
</tr>
</tbody>
</table>

Asymptotic significances are displayed. The significance level is .05.

**Independent-Samples Kruskal-Wallis Test**

- **Total N**: 246
- **Test Statistic**: 216.495
- **Degrees of Freedom**: 5
- **Asymptotic Sig. (2-sided test)**: .000

1. The test statistic is adjusted for ties.
Discussion

- Mean pain scores at admission, 48 hrs, 72 hrs, week 1, week 2, and week 3 were 8.3, 4.77, 3.47, 2.73, 1.9, and 1.72 respectively.

- 42.5% pain improvement in 48 hrs and 58.1% in 72 hrs.

- Frequency of adjunct medication used went down by 38% between 48 hours to 72 hours.

- 2 or less adjunct medications used per day after 72 hrs.

- Only 3 patients complained of nausea and 1 had constipation.

- Validated the findings of review of literature about the efficacy, safety, and tolerability of BTDS.
Limitations

- Small sample size
  - Increased the risk of Type II error
  - Result not generalizable to larger population

- Staff turn over

- Change in the ownership of the facility

- Findings only limited to chronic pain and post-operative pain
Theoretical implication
- Gate control theory of pain – controlling pain by regulating opioid receptors

Clinical implication
- BTDS can be safely and effectively substituted for Schedule II pain medications
- Provides better provision for healthcare providers to manage moderate to severe pain
- Future studies can explore the relationship between BTDS and functional status, fall, sleep, quality of life, patient satisfaction
Pain management in nursing home is a non-trivial problem

Protocol based pain management with BTDS provided adequate and sustained pain relief among patients with chronic and post-operative pain.

BTDS is a safe, effective, and efficient alternative to Schedule II pain medications for managing moderate to severe pain in nursing home patients.
Thank you!
References


GOT PAIN?