The Relationship Between Nursing Skill Mix, Nurse-Sensitive Patient Outcomes and Patient Satisfaction

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NURS 8140
01 December 2015
Primary Aim: Investigate the association between nurse staffing mix, patient outcomes, and patient satisfaction.

Research Question: What is the association between nurse skill mix, nurse sensitive patient outcomes, and patient satisfaction?
Research Studies on Healthcare Quality

The United States (US) ranked last out of seven industrialized countries

- Rising health care costs and poor overall quality of care (Kavanagh et al., 2012)

The Patient Protection and Affordable Care Act (ACA)

Goals: Reduce healthcare costs, improve quality and access

Directed Centers for Medicare and Medicaid Services (CMS) to incentivize healthcare (Kavanagh et al., 2012)

- Hospital Value-Based Purchasing Program (HVBP)
- Nursing-Sensitive Value-Based Purchasing Program (NSVBP)
- Patient Satisfaction (Pittman et al., 2012)
Background (Cont’d)

US Healthcare Systems

Hospitals

The largest component of the US healthcare system
(Pittman et al., 2012)

Nurses

The largest component of the hospital workforce

The most direct patient contact hours (Andel et al., 2012)
The Robert Wood Johnson Foundation (RWJF)

The Institute of Medicine’s (IOM)
  Recommend investments in human capital (Pittman et al., 2012)

Evidence is robust that nursing care reduces poor patient outcomes and readmission rates (“The Future of Nursing,” 2010)

Use of baccalaureate nurses comes with added cost

Key question is:
  Can hospitals invest in human capital while holding the line on costs and improving patient outcomes? (Needleman, Buerhaus, Stewart, Zelevinsky, & Mattke, 2006)
Significance

Improve Patient Safety Outcomes

Reduce Overall Healthcare Cost

Improve Patient Satisfaction

Increase Return On Withdrawal Held by CMS
Study Design

Quantitative

Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey – Patient Satisfaction

Incident Reporting - Adverse Patient Events

Associative

Not causative

Longitudinal

July 2011 – July 2015

Natural Two-Group

August 22, 2014 the nursing skill mix changed
August 22, 2014* - Nursing Skill Mix Change

Direct Patient Contact Hours by Skill Mix Impact Date:

Registered Nurses: 22.6 (61%)
Licensed Practical Nurses: 6.7 (18%)
Nurse Aides: 7.8 (21%)

Direct Patient Contact Hours Post-Impact Date:
Registered Nurses: 26.0 (70%)
Nurse Aides: 11.8 (30%)

This change resulted in a cost savings of $65,252 FY 2015.
Proposed Setting

A 207-bed teaching hospital system located in Mercer County, Pennsylvania

Unit characteristics:

- 2W – medical-surgical and telemetry
- 3W – medical-surgical
- 3MT - telemetry

Time Frame
Outcomes data collected July 2011 - June 2015
Independent Variable
- Nursing Skill Mix- RN and LPN to RN only

Dependent Variables
- Nursing Sensitive Indicators
  - Hospital Acquired Pressure Ulcer (HAPU), Fall Rates with and without Injury, Medication Errors, and Medication and Patient Scanning
- HCAHPs Patient Satisfaction Scores
  - Overall Satisfaction, Communication with
Population Sample

Medical, Surgical, and Telemetry Patients
Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) Survey

- Highly reliable/valid
- Croenbach’s Alpha and Adjusted R-Squared
- First national, standardized, publicly reported survey
- Captures uniform information on care
- Patient’s perspective
- Incentivize hospitals to improve quality of care
- Enhance awareness of the public’s responsibility
Legal & Ethical

No Human subjects
Institutional Review Board (IRB) Process
Quality Improvement Approval
Incident Reports

- Nurse reported
- Uniform collection of adverse patient events

Quality Improvement Department

- Collects and tracks the HCAHPS patient satisfaction scores and incident reports
Statistical Analysis

Descriptive Statistics:
Means, Standard Deviations, and Percentages

Significance Tests
Independent Samples t Test

Hypothesis:
No difference in mean patient satisfaction scores before and after the implementation date.
# Results: 6 Months

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean Before</th>
<th>Mean After</th>
<th>Difference</th>
<th>t Obs</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Side Effects</td>
<td>39.9%</td>
<td>41.3%</td>
<td>1.39%</td>
<td>(1.22)</td>
<td></td>
</tr>
<tr>
<td>Communicate with Nurses</td>
<td>72.1%</td>
<td>74.7%</td>
<td>2.62%</td>
<td>(4.53)</td>
<td>*</td>
</tr>
<tr>
<td>Tell About New Drug</td>
<td>70.6%</td>
<td>72.8%</td>
<td>2.23%</td>
<td>(2.20)</td>
<td>*</td>
</tr>
<tr>
<td>Nurses Listen</td>
<td>68.7%</td>
<td>72.2%</td>
<td>3.55%</td>
<td>(3.99)</td>
<td>*</td>
</tr>
<tr>
<td>Comm Meds</td>
<td>55.4%</td>
<td>57.2%</td>
<td>1.79%</td>
<td>(2.06)</td>
<td>*</td>
</tr>
<tr>
<td>Courtesy</td>
<td>79.2%</td>
<td>81.3%</td>
<td>2.17%</td>
<td>(3.80)</td>
<td>*</td>
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<tr>
<td>Nurses Explain</td>
<td>68.9%</td>
<td>70.1%</td>
<td>1.17%</td>
<td>(2.09)</td>
<td>*</td>
</tr>
<tr>
<td>Overall Satisfaction</td>
<td>58.8%</td>
<td>63.8%</td>
<td>5.08%</td>
<td>(4.03)</td>
<td>*</td>
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<tr>
<td>All Help Needed</td>
<td>71.9%</td>
<td>70.9%</td>
<td>-1.05%</td>
<td>0.80</td>
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<tr>
<td>Pain Management</td>
<td>64.3%</td>
<td>62.4%</td>
<td>-1.90%</td>
<td>1.64</td>
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</tr>
<tr>
<td>Pain Controlled</td>
<td>56.7%</td>
<td>53.8%</td>
<td>-2.92%</td>
<td>2.26</td>
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<tr>
<td>Service</td>
<td>Mean Before</td>
<td>Mean After</td>
<td>Difference</td>
<td>t Obs</td>
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<tr>
<td>Nurses Explain Side Effects</td>
<td>39.95%</td>
<td>46.57%</td>
<td>6.62%</td>
<td>2.95</td>
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<tr>
<td>Communicate With Nurses</td>
<td>72.16%</td>
<td>74.37%</td>
<td>2.21%</td>
<td>2.03</td>
<td>*</td>
</tr>
<tr>
<td>Tell About New Drug</td>
<td>70.64%</td>
<td>73.93%</td>
<td>3.29%</td>
<td>1.71</td>
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<tr>
<td>Nurses Listen</td>
<td>68.74%</td>
<td>71.07%</td>
<td>2.33%</td>
<td>1.51</td>
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<tr>
<td>Comm Meds</td>
<td>55.46%</td>
<td>57.80%</td>
<td>2.34%</td>
<td>1.44</td>
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<tr>
<td>Courtesy</td>
<td>79.22%</td>
<td>81.33%</td>
<td>2.11%</td>
<td>1.44</td>
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<tr>
<td>Nurses Explain</td>
<td>68.97%</td>
<td>70.27%</td>
<td>1.29%</td>
<td>1.18</td>
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<tr>
<td>Overall Satisfaction</td>
<td>60.04%</td>
<td>60.43%</td>
<td>0.40%</td>
<td>0.31</td>
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<tr>
<td>All Help Needed</td>
<td>71.94%</td>
<td>69.90%</td>
<td>-2.04%</td>
<td>(0.83)</td>
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</tr>
<tr>
<td>Pain Management</td>
<td>64.29%</td>
<td>62.30%</td>
<td>-1.99%</td>
<td>(0.90)</td>
<td></td>
</tr>
<tr>
<td>Pain Controlled</td>
<td>56.61%</td>
<td>54.33%</td>
<td>-2.27%</td>
<td>(0.93)</td>
<td></td>
</tr>
</tbody>
</table>
## Results: 6 Months

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<tr>
<th></th>
<th>Mean Before</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Med Errors</td>
<td>0.081</td>
<td>0.087</td>
<td>1.34</td>
</tr>
<tr>
<td>Fall Rate</td>
<td>4.541</td>
<td>4.483</td>
<td>(0.10)</td>
</tr>
<tr>
<td>HAPU</td>
<td>0.544</td>
<td>0.280</td>
<td>(1.00)</td>
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<tr>
<td>Scan Patient</td>
<td>0.965</td>
<td>0.954</td>
<td>(2.59)</td>
</tr>
<tr>
<td>Scan Meds</td>
<td>0.955</td>
<td>0.955</td>
<td>(0.12)</td>
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## Results: 12 Months

<table>
<thead>
<tr>
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<th>Mean Before</th>
<th>Mean After</th>
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</thead>
<tbody>
<tr>
<td>Med Errors</td>
<td>0.081</td>
<td>0.087</td>
<td>0.32</td>
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<tr>
<td>Fall Rate</td>
<td>4.553</td>
<td>5.323</td>
<td>1.24</td>
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<tr>
<td>HAPU</td>
<td>0.505</td>
<td>0.261</td>
<td>-0.84</td>
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<tr>
<td>Scan Patient</td>
<td>0.963</td>
<td>0.962</td>
<td>-0.359</td>
</tr>
<tr>
<td>Scan Meds</td>
<td>0.954</td>
<td>0.961</td>
<td>3.13</td>
</tr>
</tbody>
</table>
The non-equal variance approach

6 months (p<0.05)

Overall Patient Satisfaction 5%
Communication with Nurses 2.6%
Nurse Courtesy and Respect 2.1%
Nurse Listening 3.5%
Nurse Explanation 1.2%
Communication Medication 1.8%

No difference in adverse patient outcomes
Figure 6
Overall Patient Satisfaction-Proportion satisfied
July 2011 to June 2015
Figure 7
Communication With Nurses
July 2011 to June 2015

| 0.5 | 1.5 | 2.5 | 3.5 | 4.5 | 5.5 | 6.5 | 7.5 | 8.5 | 9.5 | 10.5 |
Discussion – Trend Data

Six Months

- Decrease Variation

  Statistically significant improvement in patient satisfaction scores

Further Investigation

12 months

  Decrease Variation

  Statistically significant improvement in nursing communication patient satisfaction scores was maintained

  A regression to the mean in overall patient satisfaction

Further Investigation
Limitations

HCAHPS:
Survey designs
  • Response Bias

Incident Reporting:
Nurse Report
  • Omission/Human Error

Overall Study
Small, Rural Setting
Time Constraint
A difference in means test and trend data revealed:

A significant improvement in a number of patient satisfaction scores ($p<0.05$)

No significant difference in patient safety outcomes ($p<0.05$)

The change did not negatively impact patients

Changes in nurse-staffing ratios may reduce costs while improving outcomes and patient satisfaction
Future Research

- Bachelor’s Level Training
- Continued Policy and Procedure Education
- Work Environment, and
- Patient To Nurse Ratios
Reinforcing education of policy procedures like incident reporting may benefit from a more intentional plan and further evaluation as there appears to be a positive correlation between the two in this data.
Summary

Improvement in patient satisfaction
No change to the patient safety outcomes
No negative impact
Cost of staffing was marginally decreased
Future research
This study adds to the body of evidence


Acknowledgements

Greater Pittsburgh Nursing Research Conference

Stephen Foreman, Ph. D.

LuAnn King, MSN, RN

Michelle Parcetic, Quality Improvement
Questions?

Quantitative Research Process

- BUDGET FUNDING
- PROBLEM & PURPOSE
- HYPOTHESES OR QUESTIONS
- SUMMARY & REFERENCES
- LITERATURE REVIEW
- DISCUSSION
- CONCEPTUAL FRAMEWORK
- DATA ANALYSIS
- STUDY DESIGN
- DATA COLLECTION
- SAMPLING
- LEGAL ETHICAL
- INSTRUMENTS R & V