Evaluating the Impact of Supplemented Simulation Learning Experiences on Clinical Decision Making and Clinical Competence

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Penny Alt-Gehrman MSN RN Doctoral Student
Disclosure Information For This Presentation

• There are no relevant financial relationships related to this presentation/program.

• There is no sponsorship/commercial support of this presentation/program.

• The content being presented will be fair, well-balanced and evidence-based.

• Learners must have signed the attendance roster at registration this morning and will need to complete the on-line evaluation after the conference to successfully complete this program and receive the contact hours certificate.
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• Marilyn Bratt PhD RN, Mentor
• Mauricio Garnier-Villarreal PhD, Statistician

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INCREASES

- Clinical knowledge
- Clinical decision-making (CDM) skills
- Teamwork
  (Nagle, McHale, Alexander, & French, 2009; Meakim et al., 2013; Rush, Dyches, Waldrop, & Davis, 2008)
- Self-confidence
  (Fischer & King, 2013; Leonard et al., 2010; Maas & Flood, 2012; Ricketts, 2011)

DECREASES

- Anxiety
  (Casida & Shpakoff, 2012)
Results of Improving CDM

Improves nursing practice

- Decrease in medication errors (Dickson & Flynn, 2012)

- Increase in ability to recognize a change in patient status (Parker, 2014)
What Is The Best Way to Integrate Simulation into Nursing Education?

- The National Council of State Boards of Nursing (NCSBN):
  
  *high quality simulation can substitute up to 50% of traditional clinical hours*

  (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014)

- No difference in:
  
  - **Student performance**
    (Meyer et al., 2011; Schlairet & Fenster, 2012; Hansen & Bratt, 2017)
  
  - **Clinical judgment**
    (Meyer et al., 2011)
  
  - **Critical thinking**
    (Schlairet & Fenster, 2012)
  
  - **Perception of clinical decision making**
    (Woda, Gruenke, Alt-Gehrman, & Hansen, 2016)
Simulation Curricula: Substitution vs. Supplementation

**Substitution**
- Students leave the hospital setting to participate in a simulation-based learning experience, replacing scheduled hospital clinical experiences

**Supplementation**
- Simulation-based learning is supplemental, in addition to hospital clinical experiences
Curricular Revision

• Major revision to the three medical-surgical courses
  o Chronic Illness
  o Acute Illness
  o Transition to Practice
<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hospital Based Clinical Experience Hours</strong></td>
<td>Number of substituted Sim</td>
<td>Number of supplemented Sim</td>
</tr>
<tr>
<td>Chronic Illness</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(1 day / week x 14 weeks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Illness</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>(1 day / week x 14 weeks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior Clinical</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>(104 hours with preceptor)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total # Sims</strong></td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

*Each SLE lasted between 4-6 hours each.*
The purpose of this study was to determine whether these curricular changes influenced the development of nursing students.
Specific Aims

Two classes of baccalaureate nursing students
- Final semester
- Traditional pre-licensure program
- Group 1 (May 2015) Group 2 (May 2016)

This study explored the differences in:
- Perceived CDM
- Perceived self-confidence with CDM
- Perceived anxiety with CDM
- Clinical competence
Design and Method

• Quasi-experimental design

• Participation in a novel evaluative simulation
  o Last week of the semester
  o One student per simulation
  o Brief report
  o Chart review
  o Scenario
    ▪ Identify change in condition
    ▪ Contact provider
    ▪ Implement both nursing and medical interventions
    ▪ Evaluate patient response
Measurement Instruments

- Demographics
- The Clinical Decision Making in Nursing Scale (CDMNS)
  - Cronbach’s α .83
- The Nurse Anxiety and Self-Confidence with Clinical Decision Making (NASC-CDM)
  - Cronbach’s α for self-confidence .97 and anxiety .96
- Creighton Competency Evaluation Instrument
  - Cronbach’s α .97-.98
Data Analysis

- T-test
  - Demographic differences

- Inter-rater reliability
  - CCEI Group 1 and 2 Cohen Kappa of k=1

- Bayesian Paradigm
  - Inference in observed data
## Descriptive Demographics

<table>
<thead>
<tr>
<th></th>
<th>Group 1 (N = 35)</th>
<th>Group 2 (N = 36)</th>
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<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>Female = 32</td>
<td>Female = 34</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Range = 21 - 27</td>
<td>Range = 21 - 24</td>
</tr>
<tr>
<td></td>
<td>Mean = 22</td>
<td>Mean = 22</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td>Caucasian = 29</td>
<td>Caucasian = 32</td>
</tr>
<tr>
<td></td>
<td>African American = 3</td>
<td>African America = 3</td>
</tr>
<tr>
<td></td>
<td>Asian = 1</td>
<td>Asian = 1</td>
</tr>
<tr>
<td></td>
<td>Hispanic = 2</td>
<td>Hispanic = 0</td>
</tr>
<tr>
<td><strong>Nursing Assistant (p &lt; 0.05)</strong></td>
<td>Yes = 5; No = 30</td>
<td>Yes = 23; No = 13</td>
</tr>
<tr>
<td><strong>Nurse Intern / Extern (p &lt; 0.05)</strong></td>
<td>Yes = 7; No = 28</td>
<td>Yes = 19; No = 17</td>
</tr>
</tbody>
</table>
Mean Differences in Group Scores

Anxiety:
- Group 1: 61.27
- Group 2: 61.84

CDMNS:
- Group 1: 96
- Group 2: 96.87

Self-Confidence:
- Group 1: 123.04
- Group 2: 120.73
Clinical Competency Mean Differences in Group Scores

<table>
<thead>
<tr>
<th>Category</th>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCEI Total</td>
<td>12.44</td>
<td>14.17</td>
</tr>
<tr>
<td>*CCEI Assessment</td>
<td>1.9</td>
<td>2.28</td>
</tr>
<tr>
<td>CCEI Communication</td>
<td>3.37</td>
<td>3.64</td>
</tr>
<tr>
<td>CCEI Clinical Judgment</td>
<td>3.73</td>
<td>4.33</td>
</tr>
<tr>
<td>CCEI Patient Safety</td>
<td>3.44</td>
<td>3.92</td>
</tr>
</tbody>
</table>
Limitations

• Volunteers
  o Non-diverse sample

• Only evaluated one model (single site)

• Unknown previous patient exposure

• Unable to blind groups

• Preceptor model vs faculty oversite
Impact on Nursing Education

• Supplementation vs. substitution may be a better model

  o Patient assessments
  o Communication skills
  o Clinical judgment
  o Safer care
Future Research

• Repeat this study:
  o Larger sample size
  o Multiple sites

• Longitudinal measures throughout curriculum

• Preceptorship model vs faculty led clinical

• Evaluate performance in a clinical setting
Questions

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References


### Mean Differences in Group Scores

<table>
<thead>
<tr>
<th></th>
<th>Control Mean</th>
<th>Simulation Mean</th>
<th>Mean Difference (SE)</th>
<th>Mean Difference 95% CI</th>
<th>Cohen d Mean (SD)</th>
<th>Cohen d 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCEI Total</td>
<td>12.44</td>
<td>14.17</td>
<td>1.73 (0.61)*</td>
<td>0.53, 2.92</td>
<td>0.65 (0.23)</td>
<td>0.19, 1.11</td>
</tr>
<tr>
<td>CCEI Assessment</td>
<td>1.9</td>
<td>2.28</td>
<td>0.38 (0.12)*</td>
<td>0.14, 0.61</td>
<td>0.73 (0.24)</td>
<td>0.26, 1.19</td>
</tr>
<tr>
<td>CCEI Communication</td>
<td>3.37</td>
<td>3.64</td>
<td>0.27 (0.16)</td>
<td>-0.06, 0.59</td>
<td>0.38 (0.23)</td>
<td>-0.08, 0.84</td>
</tr>
<tr>
<td>CCEI Clinical Judgment</td>
<td>3.73</td>
<td>4.33</td>
<td>0.60 (0.32)</td>
<td>-0.02, 1.23</td>
<td>0.44 (0.23)</td>
<td>-0.02, 0.90</td>
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<tr>
<td>CCEI Patient Safety</td>
<td>3.44</td>
<td>3.92</td>
<td>0.48 (0.28)</td>
<td>-0.07, 1.03</td>
<td>0.40 (0.23)</td>
<td>-0.05, 0.86</td>
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<tr>
<td>CDMNS</td>
<td>96.0</td>
<td>96.87</td>
<td>0.87 (2.29)</td>
<td>-3.77, 5.18</td>
<td>0.09 (0.23)</td>
<td>-0.38, 0.54</td>
</tr>
<tr>
<td>Self Confidence</td>
<td>123.04</td>
<td>120.73</td>
<td>-2.31 (3.94)</td>
<td>-10.15, 5.48</td>
<td>-0.13 (0.23)</td>
<td>-0.59, 0.32</td>
</tr>
<tr>
<td>Anxiety</td>
<td>61.27</td>
<td>61.84</td>
<td>0.57 (4.27)</td>
<td>-7.89, 8.91</td>
<td>0.03 (0.23)</td>
<td>-0.43, 0.46</td>
</tr>
</tbody>
</table>

SE = Standard Error, SD = Standard Deviation, CI = Credible Interval

* = group means difference meaningfully different from 0