REMEDIATION: A 10-YEAR FOLLOW-UP SYSTEMATIC REVIEW

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DARRELL SPURLOCK, JR. PHD, RN, NEA-BC, ANEF
OVERVIEW

• Background
• Question
• Defining the Construct
• Method
• Results
• Discussion
• Supplementary Findings
• Considerations for Future Research
BACKGROUND

Research Rigor:
- RWJF
- NLN
- IOM

First-time NCLEX-RN pass rate

Remediation
BACKGROUND

• A systematic review of the effectiveness of remediation interventions to improve NCLEX-RN pass rates (Pennington & Spurlock, 2010)
  • “NCLEX-RN” and “remediation”
  • 1995-2009
  • N=8
  • Single-site, descriptive reports
  • Inadequate empirical design
QUESTION

• What is the evolutionary state of nursing science surrounding the use of remediation related to first-time NCLEX-RN pass rates over the past decade?
DEFINING THE CONSTRUCT

Strengthening deficit in response to an identified weakness; potential to impinge outcomes if not addressed.
- Culleiton (2009)

"Timely, supplemental, and individualized"
- Custer (2018)

Formal process; developed for an individual, at-risk student.
- Thilges & Schmer (2020)
### METHOD

- Experimental “gold standard” checklist  
  (Pennington & Spurlock, 2010)

- Note: Each component scored as 1 = criteria met or 0 = criteria not met

<table>
<thead>
<tr>
<th>Study Component</th>
<th>Criteria Against Which Study is Evaluated</th>
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<tr>
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**• Experimental “gold standard” checklist**  
(Pennington & Spurlock, 2010)
METHOD

- Medical Education Research Study Quality Instrument (MERSQI) (Reed et al., 2007)
  - 10-item instrument
  - Cronbach alpha = 0.6
  - Interrater reliability = 0.78-0.998
  - Criterion Validity ($p = 0.73; CI = 0.56-0.84; P<.001; ICC = 0.80; CI, 0.49-0.85$)
### Medical Education Research Study Quality Instrument
*(adapted from Reed, et al. (2007, p. 1004)*

<table>
<thead>
<tr>
<th>Domain</th>
<th>MERSQI Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Study Design</strong></td>
<td>Single group cross-sectional or single group posttest only</td>
</tr>
<tr>
<td></td>
<td>Single group pretest &amp; posttest</td>
</tr>
<tr>
<td></td>
<td>Nonrandomized, 2 groups</td>
</tr>
<tr>
<td></td>
<td>Randomized controlled trial</td>
</tr>
<tr>
<td><strong>Sampling</strong>*</td>
<td>Number of institutions studied:</td>
</tr>
<tr>
<td></td>
<td>Response rate, %:</td>
</tr>
<tr>
<td><strong>Type of Data</strong></td>
<td>Assessment by participants</td>
</tr>
<tr>
<td></td>
<td>Objective measurement</td>
</tr>
<tr>
<td><strong>Validity of Evaluation Instrument</strong>*</td>
<td>Internal structure:</td>
</tr>
<tr>
<td></td>
<td>Content:</td>
</tr>
<tr>
<td></td>
<td>Relationships to other variables:</td>
</tr>
<tr>
<td><strong>Data Analysis</strong>*</td>
<td>Appropriateness of analysis:</td>
</tr>
<tr>
<td></td>
<td>Complexity of analysis:</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>Satisfaction, attitudes, perceptions, opinions, general facts</td>
</tr>
<tr>
<td></td>
<td>Knowledge, skills</td>
</tr>
<tr>
<td></td>
<td>Behaviors</td>
</tr>
<tr>
<td></td>
<td>Patient/health care outcome</td>
</tr>
</tbody>
</table>
FINAL DECISION ON SCORING INSTRUMENT

- **Gold Standard List** (Pennington & Spurlock, 2010)
  - Continued to meet needs for current systematic review
  - Consistency with prior review published in 2010

- **MERSQI**
  - Demonstrated usefulness in nursing research (Yucha, 2011)
  - However, not all scoring items applicable for systematic review
    - Response rate
    - Validity
## Levels of Evidence for Decision Making in Evidence-Based Practice

ACKLEY ET AL. (2008)

<table>
<thead>
<tr>
<th>Level</th>
<th>Type of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Systematic reviews, meta-analysis of randomized clinical trials (RCTs), evidence-based clinical practice guidelines based on systematic reviews of RCTs, or three or more RCTs of good quality that have similar results</td>
</tr>
<tr>
<td>II</td>
<td>One or two well-designed RC</td>
</tr>
<tr>
<td>III</td>
<td>One or more well-designed controlled trials without randomization</td>
</tr>
<tr>
<td>IV</td>
<td>One or more well-designed case control or cohort studies</td>
</tr>
<tr>
<td>V</td>
<td>Systematic reviews of descriptive and qualitative studies (meta-synthesis)</td>
</tr>
<tr>
<td>VI</td>
<td>Single descriptive or qualitative study</td>
</tr>
<tr>
<td>VII</td>
<td>Expert opinions and/or reports of expert committees</td>
</tr>
</tbody>
</table>
PREFERRED REPORTING ITEMS FOR SYSTEMATIC REVIEWS AND META-ANALYSES (PRISMA)

✓ 27 Item Checklist
✓ Highlights the importance of assessing bias in research
✓ Steps followed when applicable for current systematic review
IDENTIFICATION

Literature Search
English; "NCLEX" and "remediation"; 2009-2019

Systematic Search: (73)
- EbscoHost databases
  - Academic Search Premier, Cumulative Index for Nursing and Allied Health Literature, Education Research Complete, Educational Resources Information Center, Health Source: Nursing/Academic Edition, Medline

Primary Exploratory Search: (999)
- Google Scholar
SCREENING & ELIGIBILITY

Total Search Results: (1,072)

Review applying inclusion criteria:
- Theme of discussing remediation strategies and the effects on NCLEX-RN success
- Undergraduate registered nursing program: Diploma, ADN, BSN

Exclusion categories (1060 + 3 = 1063)

(a) Manual review for duplicates: (57)
(b) LPN/other discipline: (76)
(c) Dissertation/thesis: (391)
(d) Predictors of success: (44 + 1 = 45)
(e) Informative; lacks remediation: (44 +2 = 46)
(f) Validate accuracy of proprietary products/assessments: (33)
(g) Reviewed in original SR: (2)
(h) Testing policy: (3)
(i) Presentation/poster: (31)
(j) Citation: (21)
(k) Clinical simulation: (37)
(l) Book/report/bulletin/minutes: (156)
(m) Other: (165)
Number included from systematic and primary exploratory searches: 12

Secondary Exploratory Search of References: 4
- Excluded: 3; Included: 1

Final number included from all searches: 13
<table>
<thead>
<tr>
<th>Author (Year)</th>
<th>Search Type</th>
<th>Journal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johnson (2009)</td>
<td>Secondary</td>
<td>Nursing Education Perspectives</td>
</tr>
<tr>
<td></td>
<td>Exploratory</td>
<td></td>
</tr>
<tr>
<td>Carr (2011)</td>
<td>Systematic</td>
<td>Nursing Education Perspectives</td>
</tr>
<tr>
<td>Harding (2012)</td>
<td>Primary</td>
<td>Teaching and Learning in Nursing</td>
</tr>
<tr>
<td></td>
<td>Exploratory</td>
<td></td>
</tr>
<tr>
<td>Reinhart et al. (2012)</td>
<td>Systematic</td>
<td>Journal of Nursing Education</td>
</tr>
<tr>
<td>Horton et al. (2012)</td>
<td>Systematic</td>
<td>Teaching and Learning in Nursing</td>
</tr>
<tr>
<td>Corrigan et al. (2014)</td>
<td>Systematic</td>
<td>Nurse Educator</td>
</tr>
<tr>
<td>Cherkis &amp; Rosciano (2015)</td>
<td>Primary Exploratory</td>
<td>Open Journal of Nursing</td>
</tr>
<tr>
<td>Pullen (2017)</td>
<td>Primary Exploratory</td>
<td>Nursing 2017</td>
</tr>
<tr>
<td>Puskar (2017)</td>
<td>Primary Exploratory</td>
<td>Journal of Nursing Education and Practice</td>
</tr>
<tr>
<td>Pence &amp; Wood (2018)</td>
<td>Primary Exploratory</td>
<td>Nursing Education Perspectives</td>
</tr>
<tr>
<td>Myles (2018)</td>
<td>Systematic</td>
<td>Teaching and Learning in Nursing</td>
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RESULTS

Design

Experimental with random assignment to groups

Level of Evidence:

- Level VI- Single descriptive or qualitative study
  12/13 (92%)
- Level IV- One or more well-designed case control or cohort studies
  Horton et al. (2012):
  “treatment as usual” vs “enhanced remediation” groups

Design

- All descriptive
- Majority retrospective
RESULTS

Sample Size
Determine by power analysis; if not, then at least 80, for 40 in each group of a two-group study

- No power analysis performed
- 10/13 (77%)- no sample size reported or inadequate sample size
- Horton et al. (2012)
  TAU: n = 41
  ER: n = 51
- Cole & Adams (2014)
  N = 790 (10 cohorts of approx. 79 students each)
- Pence & Wood (2018)
  N = 195 total
Factors Affecting Generalizability

- Threats to external validity minimized; significant ones addressed; demographic and geographic information is reported; multiple sites/years used to avoid focused variability in data

- Demographic and geographic data unclear or not reported in all articles
- All single site studies
- Cole & Adams (2014):
  - Multiple cohort study- 10 cohorts in total
## RESULTS

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- **8/13 (62%) scored “does not meet”**
  - Majority included bundles of multifaceted interventions
    - Practice questions, emotional and physical wellness, confidence building (Johnson, 2009)

- **5/13 (38%) scored “meets”**
  - Detailed tutorial requirements and hours for remediation work (Horton et al., 2012)
  - Adaptive quizzing requirements outlined; vendor identified (Cox-Davenport & Phelan, 2015)
RESULTS

Description Clearly stated; could be replicated (e.g., "study skills" is not clear; "note-taking strategies using paper divided into columns" is clearer)

- 10/13 (77%) scored “does not meet”
  - Non specific/non replicable as specifics related to remediation requirements unclear.: “practice questions” (Johnson, 2009), standardized, yet “custom” assessments (Carr, 2011; Pullen, 2017)

- 3/13 (23%) scored “meets”
  - Specific in description of course requirements and expected remediation activities: vendor identified and # of required questions discussed (Corrigan et al., 2014; Cox-Davenport & Phelan, 2015); 14-step review (Cole & Adams, 2014)
RESULTS

Confounders Addressed

Confounders Confounding factors that could not be controlled are addressed and accounted for

- 12/13 (92%) scored as “does not meet”

- Pence & Wood (2018)
  - Differences in 2 cohorts examined via chi-square analysis & independent t-tests
  - gender, race, nursing failures, other degrees, age, science GPA & nursing GPA
## RESULTS

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<th>Primary Outcome Measure</th>
<th>NCLEX-RN pass rates, using NCBSN data (not self-calculated data)</th>
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- **6/13 (46%) - reported actual NCLEX-RN pass rates**

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- **3/10 (23%) - reported standardized examination scores (Reinhart et al., 2012; Cole & Adams, 2014; Cox-Davenport & Phelan, 2015)**
RESULTS

Statistical Reporting
Correct test; statistical significance, means, & standard deviations, effect size; confidence intervals if no \( p \) values; for trending data, three or more years or data points are provided; national trends in NCLEX-RN scores are accounted for

- 12/13 (92%) - not reported or not appropriate analysis
  Bonferroni correction (Horton et al., 2012)
  Chi-square analysis (Pence & Wood, 2012)

- Cox-Davenport & Phelan (2015)
  Inverse correlation reported between AQS and predictor examination
## RESULTS

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- 10/13 (77%)- no recommendations, recommendations stemmed from literature review, or overreached with recommendations  
  - More standardized exams and remediation in curriculum (Puskar et al., 2017)

- Discussed change in policy from mandatory predictor score to AQS (Cox-Davenport & Phelan, 2015)
DISCUSSION

• Quality of evidence for remediation to improve NCLEX-RN pass rates declined considerably between 2010 & 2020

• 2.7x more titles from systematic search

• Pennington & Spurlock (2010):
  • "well-designed experimental or quasi-experimental research studies that evaluate individual, well-defined remediation interventions... with samples of adequate size and under desirable conditions." (p. 491-492)

<table>
<thead>
<tr>
<th></th>
<th>Titles</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
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<tr>
<td>2010</td>
<td>27</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2020</td>
<td>73</td>
<td>1.92</td>
<td>1</td>
<td>1</td>
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DISCUSSION

• Overarching issue
  • Conceptual dissonance between nursing education and higher education
    • Pre/co-requisite: reading, writing, mathematics
    • At risk vs all
      • 6/13- “at risk”
      • 7/13- “all”
DISCUSSION

• Drift from remediation as traditionally understood:
  • *Treatment* for decreased first-time NCLEX-RN pass rate is often an indistinct dose and type of remedial intervention.
  • Lack of discussion of NCLEX-RN pass rate variability on a quarterly basis, or consideration of factors beyond the student level is common
SUPPLEMENTARY FINDINGS

Cyclic nature of first-time NCLEX-RN pass rate
SUPPLEMENTARY FINDINGS

- Interval 4.95 years on average
  - Trigger
    ✓ Concerning NCLEX-RN pass rate
  - Implementation
    ✓ Intervention including remediation activity
  - Publication
    ✓ Publish date
CONSIDERATIONS FOR FUTURE RESEARCH

• Methodological Quality
  • Guidelines available
    • PRISMA (Mohr et al., 2009)
    • Journal Article Reporting Standards (JARS) (APA, 2010)

• Expand foci beyond isolated intervention
  • Programmatic characteristics influencing NCLEX-RN success (Odom-Maryon et al., 2018)
  • Faculty and student variables influencing student achievement (Schneider & Preckel, 2017)
THANK YOU!

QUESTIONS?

Contact Information:
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