The Influences of Nursing School Characteristics on NCLEX-RN® Pass Rates: A National Study

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Overview

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Background

- National Council Licensure Examination for Registered Nurses (NCLEX-RN®) first-time pass rates (FTPR) have been used as a performance outcome for many years:
  - 80% minimum pass rate
  - At or above 90% internal pass rate

- Interventions addressing poor NCLEX-RN® outcomes have focused on:
  - Raising admission requirements
  - Including standardized exams in classes
The Problem

- Institutional characteristics (IC) impact the development of evidence-based regulatory policies
  - e.g. faculty credentialing, faculty to student ratios

- Few studies documenting associations with NCLEX-RN® FTPR.
  - Single or small number of programs
  - Very focused in the characteristics examined
    - e.g. class size, percentage of faculty with doctoral degrees

- National study of schools of nursing is needed to:
  - Examine current practices related to IC
  - Identify associations between IC and FTPR
Research Questions

1) What is the relationship between faculty credentials and pass rates?

2) Are didactic and clinical faculty-student ratios associated with pass rates?

3) Is use of standardized tests associated with pass rates?

4) Are the numbers of semester/quarter hours in individual didactic and clinical courses associated with pass rates?
Approach

- Invited all nursing program administrators in the US
  - N=2,093
  - ADN, BSN and diploma programs
  - Searched program websites for Program Administrator emails

- 2014 FTPR obtained from state Board of Nursing websites
Survey Design

- Study conducted during the 2015-2016 academic year
- Stratified sampling
  - a) FTPR ≥ 90%
  - b) FTPR between 80% and 90%
  - c) FTPR < 80%
- A mixed-mode approach over a 10-week period
Instrument

- Self-reported survey tool (30 questions)

- Content validity
  - Expert panel review (n=5)
  - Piloted by 10 programs

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NCLEX RN Survey

For the undergraduate pre-licensure nursing programs, please complete the following data fields. Where possible, provide answers based on the information that would have affected those taking the NCLEX in 2014 (from approximately 2011/2012 admission cycle).

Admissions:

1. Please indicate which of the following are required by your college/school of nursing for determining admission of students into the nursing curriculum (SELECT ALL THAT APPLY).

<p>| Minimum required |<br />
|------------------|--------------------------|
| i. Cum College GPA | (range 1.5-2, 2-2.5, 2.5-3, 3-3.5, 3.5-4) |
| ii. Prereq GPA     | (range 1.5-2, 2-2.5, 2.5-3, 3-3.5, 3.5-4) |
| iii. Science prereq GPA | (range 1.5-2, 2-2.5, 2.5-3, 3-3.5, 3.5-4) |
| iv. NLN Pre admit exam | |
| v. TEAS           | |</p>
<table>
<thead>
<tr>
<th>Institutional</th>
<th>Required Admission</th>
<th>Progression / Graduation Criteria</th>
<th>Curriculum</th>
<th>Faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural/Urban</td>
<td>Cum GPA</td>
<td>Course grades</td>
<td>Integrated curriculum</td>
<td>No. students per didactic faculty</td>
</tr>
<tr>
<td>Public/other</td>
<td>Prereq GPA</td>
<td>Min pass course grade</td>
<td>Use of simulation</td>
<td>No. students per clinical faculty</td>
</tr>
<tr>
<td>Accreditation</td>
<td>Science GPA</td>
<td>No. times repeat course</td>
<td></td>
<td>% didactic courses faculty (doctoral)</td>
</tr>
<tr>
<td>Summer classes offered</td>
<td>Pre-admit exam</td>
<td>No. courses repeated</td>
<td></td>
<td>% didactic courses faculty (specialty cert)</td>
</tr>
<tr>
<td>Sem / Quarters</td>
<td>CNA training</td>
<td>Progress standard exams</td>
<td></td>
<td>% didactic course faculty (nurse ed cert)</td>
</tr>
<tr>
<td>Cohort size</td>
<td>Interviews</td>
<td>Grad exit exam</td>
<td></td>
<td>% full-time faculty</td>
</tr>
<tr>
<td>% students working FT</td>
<td>LOR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistance ESL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Statistical Methods

- Descriptive analyses
  - FTPR > 80% and FTPR < 80% using frequencies

- Univariable and multivariable analyses
  - Multilevel modeling was performed to examine the association between NCLEX-RN FTPR with IC
    - random intercept model with an unstructured covariance matrix
    - continuous attributes modeled as continuous Independent variables

- Examined missing data patterns

- All significant attributes from univariable models included in multivariable model
Results

Response rate: 40% (n=832 of 2,083 programs)
## Results

### Overall Characteristics of Responding Nursing Programs (n=832)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>50%</td>
</tr>
<tr>
<td>Public</td>
<td>72%</td>
</tr>
<tr>
<td>Accredited</td>
<td>94%</td>
</tr>
<tr>
<td>Semesters</td>
<td>92%</td>
</tr>
<tr>
<td>Conferred ADN</td>
<td>54%</td>
</tr>
<tr>
<td>Conferred BSN</td>
<td>41%</td>
</tr>
<tr>
<td>Institutional</td>
<td>Admission</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Rural/Urban</td>
<td>Cum GPA</td>
</tr>
<tr>
<td>Public/other</td>
<td>Prereq GPA</td>
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<td>% students working FT</td>
<td>LOR</td>
</tr>
<tr>
<td>Assistance ESL</td>
<td></td>
</tr>
</tbody>
</table>
Results: Univariable Models

OR = 1.47 [1.04, 2.09]  
p = 0.03

Other includes private-not for profit (n=179) and private-for profit (n=36) colleges
Results: Univariable Models

OR = 1.71 [1.01, 2.90],

$p = 0.05$

Caution: Small sample size for programs on quarters.
Results: Univariable Models

OR = 1.07 [1.02, 1.12], p = 0.006

Odds for increase in cohort size of 10 students
Results: Univariable Models

**Ratio of Didactic Faculty to Students**

<table>
<thead>
<tr>
<th>No. Students Per Didactic Faculty</th>
<th>% Programs with FTPR ≥80%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 25 (n=390)</td>
<td>73</td>
</tr>
<tr>
<td>26-50 (n=312)</td>
<td>74</td>
</tr>
<tr>
<td>51-75 (n=37)</td>
<td>84</td>
</tr>
<tr>
<td>&gt;= 76 (n=18)</td>
<td>89</td>
</tr>
</tbody>
</table>

OR=1.12  [1.01, 1.24]
p=0.04

Odd for increase of 10 students
Results: Univariable Models

OR = 1.11 [1.03, 1.18], p = 0.003

Odd for increase of 10%
Results: Univariable Models

Odds ratio associated with not using exam for admission

OR=2.14 [1.34, 3.40]  
\( p = 0.002 \)
Results: Univariable Models

Odd ratio associated with not using exam for progression

OR = 1.43, [1.02, 2.00], p = 0.04
## Multivariable Results

<table>
<thead>
<tr>
<th>Institutional Characteristic</th>
<th>Categories</th>
<th>OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent full-time faculty</td>
<td>Increase of 10% of faculty</td>
<td>1.12 (1.03, 1.21)</td>
<td>0.002</td>
</tr>
<tr>
<td>Standardized exam required for admission</td>
<td>No</td>
<td>2.28 (1.30, 3.09)</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>reference group</td>
<td></td>
</tr>
<tr>
<td>Organization Type</td>
<td>Public</td>
<td>1.65 (1.12, 2.43)</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>reference group</td>
<td></td>
</tr>
</tbody>
</table>
Discussion: Institutional Characteristics

- Association between public schools and higher FTPR
  - Public schools have larger admission cohort sizes (>50 students) compared to other (49% versus 39%)
  - Pass rates for schools with smaller cohort sizes are more heavily influenced by individual student performance
Discussion: Admission and Progression

- Association between use of standardized exams for pre-admission and lower FTPR

- High performing schools may not have needed to implement standardized exams

- Interventions to address poor NCLEX-RN outcomes began as early as 2011 (Koestler, 2015), but may not have been in place long enough to impact 2014 FTPR
Discussion: Faculty Attributes

- Consistent with Longbach (2012), non-significant association between higher FTPR and:
  - Percentages of faculty with doctoral degrees
  - Faculty certified in their specialty
  - Faculty certified in nursing education

- Association between more full-time faculty and higher FTPR
Limitations

- Possible recall bias by administrators

- Aggregated student-level data versus individual student-level data
Implications: Future Research

- Need for a longitudinal study that includes:
  - Both institution-level and student-level data
  - More recent data that may capture the impact of programmatic changes
  - Multiple years of data
  - Additional student attributes
Implications: Administrators and Leaders

- Compare their school’s institutional characteristics to a large, national sample
  - 38% of programs reported half or more of their students work greater than 20 hours per week
  - 57% of program reported that they do not provide assistance for non-native speakers of English

- Align and standardized data collection efforts for future
Questions?