Assessment of Genomic Knowledge among Nurses in an Online RN to BSN Completion Program

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Introduction and Background

- Nurses must have a basic understanding of genetics-genomics in order to provide appropriate care.
- Genetic-genomic education has begun to be integrated into undergraduate and graduate nursing curricula.
- There continues to be a gap in genetic-genomic knowledge among student nurses, practicing nurses, and nursing faculty.

Purpose

The purpose of this study was to:
- Assess the genetics-genomics knowledge of nurses in an online RN to BSN completion program.
- Identify the knowledge and misconceptions of foundational genetic-genomic concepts.
- Evaluate differences in scores based on demographic data.

Methods

- Cross-sectional descriptive study.
- Convenience sample of RNs enrolled in or recently graduated from an online RN to BSN completion program at a large urban university in the Mid-Atlantic region of the United States.
- Participants were given access to the Genomic Nurse Concept Inventory (GNCI©) via a web-based link.
- Scores can range from 0 to 31, with higher scores indicating increased knowledge.
- The GNCI maps to 18 concepts in 4 topical categories (genome basics, mutations, inheritance, and genomic health care).
- Distractors used represented common misconceptions of genomic concepts.

Results

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Description</th>
<th>Mean Score</th>
<th>% Correct</th>
<th>Cronbach's alpha</th>
<th>High Scorers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aiello 2014</td>
<td>181 RN to BSN students</td>
<td>13.76</td>
<td>44%</td>
<td>0.72</td>
<td>* Students who had already graduated from RN to BSN program (p=0.002)</td>
</tr>
<tr>
<td>Ward, Haberman, &amp; Barbosa-Leiker, 2014</td>
<td>705 upper level baccalaureate nursing students</td>
<td>14.59</td>
<td>47%</td>
<td>0.77</td>
<td>*Males * Students previously took genetics course * Students in final semester</td>
</tr>
<tr>
<td>Ward, French, Barbosa-Leiker, &amp; Iverson, 2016</td>
<td>758 upper-division BSN students</td>
<td>13.26</td>
<td>42.8%</td>
<td>0.73</td>
<td>*Males * Students previously took genetics course</td>
</tr>
<tr>
<td>Ward, Purath, &amp; Barbosa-Leiker, 2016</td>
<td>1002 students in varied progression in UG nursing program at 14 different schools of nursing</td>
<td>12.85</td>
<td>41.5%</td>
<td>0.73</td>
<td>*Males * Students previously took genetics course * Students in accelerated programs</td>
</tr>
<tr>
<td>McCabe, Ward, &amp; Riciardi, 2016</td>
<td>75 practicing pediatric nurses</td>
<td>13.7</td>
<td>44%</td>
<td>0.76</td>
<td>Not reported</td>
</tr>
<tr>
<td>Read &amp; Ward, 2016</td>
<td>495 nursing faculty</td>
<td>14.93</td>
<td>48%</td>
<td>0.79</td>
<td>* Higher self-rated proficiency * Doctoral degree * Took genetics course * Taught either stand-alone genetics course or lecture content within nursing or related course</td>
</tr>
<tr>
<td>Munroe, 2016</td>
<td>109 undergraduate junior BSN students</td>
<td>Pretest=13.83 Posttest=15.49</td>
<td>Not reported</td>
<td>Not reported</td>
<td>* Significant posttest improvement after receiving genomics content over 1 semester</td>
</tr>
</tbody>
</table>

Discussion and Conclusion

- RN to BSN nursing students scored similarly to previous cohorts, indicating low knowledge.
- The questions that > 50% of the sample answered incorrectly were predominantly in the genome basics category.
- The questions in which a distractor (misconception) was chosen by 50% or more of the sample were predominantly in the genome basics category.
- Nurses need to have a stronger understanding of genomic science in order to build new knowledge.
- A pre-requisite or required course in genomic science may improve the understanding of genomic basics.
- Genomics should be integrated into nursing curricula.
- Faculty need to improve their knowledge about genomics.

Ausubel’s Theory of Assimilation guided this research. Ausubel differentiates between rote knowledge (memorization) and meaningful knowledge.
- Meaningful knowledge is attained when new knowledge is assimilated with pre-existing knowledge.
- Meaningful knowledge is linked to concepts and retained longer than rote knowledge.
- The caveat is that if a person’s pre-existing knowledge includes misconceptions, new learning can be distorted.

References


Future Research

Future research should include:
- Evaluating the best methods to improve genomic knowledge.
- Using the GNCI as a summative assessment & using it to guide curricula development.
- Testing graduate nurses with the GNCI.
- Measuring how integration of genomic knowledge improves patient outcomes.