Predictors of PA Student Success on the PANCE: An Expanded Look

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ABSTRACT

PURPOSE: The purpose of this study was to validate a previous single site study that investigated the association between academic performance in specific undergraduate science courses and student score on the Physician Assistant National Certifying Examination (PANCE). This study was expanded to include an additional PA program. Covariates age and gender were also included in the analysis to identify predictive factors of student passage of the PANCE.

METHODS: A retrospective cohort study of student records of first attempt Chemistry I, Pathophysiology, and Biochemistry course grades and first attempt PANCE scores for PA graduates from two private, not-for-profit, colleges located in the Northeastern United States (n = 204) from 2006-2010 were included. SPSS version 22 software was used to analyze the data using correlation and multiple hierarchical regression analysis.

RESULTS: Pathophysiology (p < .001) and biochemistry (p < .001) had a significant positive regression coefficients predicting higher PANCE scores of 59.21 and 50.17 points, respectively, for every one unit increase in Pathophysiology course grade (i.e. B to A) after controlling for age and gender. Age (p < .001) had a significant negative regression coefficient, predicting lower PANCE scores of 4.4 points for every unit increase in age (i.e. 30 to 31).

DISCUSSION: The results of this study support results found in the previous single site study which indicated that higher grades in specific undergraduate science courses, (pathophysiology and biochemistry), predicted higher PANCE scores. In addition, an increase in age was found to be predictive of lower scores. Identifying predictive factors of PANCE passage may help to identify a student’s ability to pass the PANCE early in the curriculum, as well as improve program quality and graduate success.

INTRODUCTION:

• Expected physician shortage of approx. 130,000 by 2025.
• Greater demand for health care providers including physician assistants (PAs).
• The current number of accredited PA programs is 196.
• Since the passage of the PPACA in 2010, the number of accredited PA programs increased by 47, including 41 programs with provisional accreditation.
• It is important for programs to identify possible predictors of PANCE success.

VARIANCE: Together the four independent variables accounted for 33% of variance in PANCE score suggesting a medium effect.

METHODS:

• Full IRB approval was obtained from D’Youville College.
• Retrospective cohort study of student records of first attempt Chemistry I, Pathophysiology, and Biochemistry course grades and first attempt PANCE scores for PA graduates from D’Youville College (n = 155) and Daemen College (n = 49) from 2006-2010 were included along with age, and gender.
• Grades, gender, and age at time of graduation were obtained from college’s central data information system or in student files.
• PANCE scores were retrieved from NCCPA records.
• Grades were converted to a numerical score based on the college grade point average conversion system (i.e., A = 4.0, A- = 3.67, B+ = 3.33, B = 3.0…F = 0.0).
• SPSS® Version 22 was used for descriptive analysis, simple linear correlation analysis, and hierarchical multiple regression analysis.

RESULTS: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry I grade</td>
<td>199</td>
<td>1.0</td>
<td>4.0</td>
<td>3.28</td>
<td>0.75</td>
</tr>
<tr>
<td>Pathophysiology grade</td>
<td>204</td>
<td>.7</td>
<td>4.0</td>
<td>3.26</td>
<td>0.71</td>
</tr>
<tr>
<td>Biochemistry grade</td>
<td>204</td>
<td>0.0</td>
<td>4.0</td>
<td>3.14</td>
<td>0.76</td>
</tr>
<tr>
<td>Age</td>
<td>204</td>
<td>22.0</td>
<td>60.0</td>
<td>28.33</td>
<td>7.11</td>
</tr>
<tr>
<td>PANCE score</td>
<td>204</td>
<td>200</td>
<td>855</td>
<td>517</td>
<td>128</td>
</tr>
<tr>
<td>Gender: female</td>
<td>155</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>49</td>
<td></td>
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</tbody>
</table>

Results of Multiple Hierarchical Analysis

• Full model was statistically significant, $R^2 = .33$, $F(4, 199) = 24.87$, $p < .001$.
• Pathophysiology: predicting higher PANCE score of 59.21 points for every one unit increase.
• Biochemistry: analysis predicting higher PANCE scores of 50.17 points for every one unit increase.
• Age (p < .001) had a significant negative regression coefficient, predicting lower PANCE scores of 4.4 points for every unit increase in age.
• CHE I and Gender were not a significant predictors of PANCE.

VARIANCE: Together the four independent variables accounted for 33% of variance in PANCE score suggesting a medium effect.

PANCE Score Estimation: Using regression coefficients and holding all of the other variables constant at their means, PANCE score can be determined based on the letter grade achieved.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>GPA Achieved and Predicted PANCE Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathophysiology</td>
<td>A (4.0), B (3.0), C (2.0)</td>
</tr>
<tr>
<td>Biochemistry</td>
<td>A (4.0), B (3.0), C (2.0)</td>
</tr>
</tbody>
</table>

Conclusions

• Science courses grades (Pathophysiology and Biochemistry) can predict future PANCE scores.
• Important implications for faculty:
  • Identifying students earlier in the PA curriculum at risk for lower PANCE scores, allowing for additional instruction or remediation.
  • Identifying factors that predict PANCE success will help to:
    • improve program quality
    • improve graduate success
    • help to fill the void in physician shortage

Limitations and Future Implications

• Small sample size
• External variables such as student pre-professional preparation cannot be controlled for and can vary widely based on course instructor.
• PA programs should analyze their own curriculum to determine which courses they offer that are most predictive of PANCE success.
• Specific examination of course grade courses and admission criteria needs to occur to determine additional variables that may be predictive of PANCE passage.
• Faculty should also examine their own institution’s minimum grades required in pre-requisite classes to determine which may be predictive of PANCE success.

References