Reliability and Validity of PAEA End-of-Rotation Exam Scores

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Background

In 2013, PAEA launched End-of-Rotation (EOR) exams covering core clinical rotation content. These exams are starting to be utilized like the National Board of Medical Examiner's subject exams, but have not yet been evaluated for reliability or validity against outcomes such as the Physician Assistant National Certification Exam (PANCE).

Purpose

This study's purpose was to determine if a composite scale based on all seven PAEA EOR exams can be used as an effective measure of comprehensive medical knowledge for physician assistant students in their clinical year and a predictor for performance on PANCE.

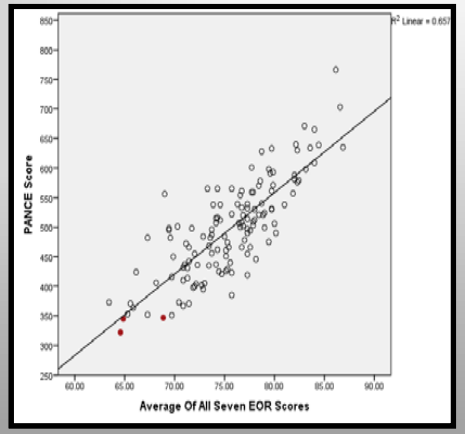
Methods

This study was a retrospective analysis of pre-existing, de-identified data gathered by three physician assistant programs for educational purposes. Scores for all seven PAEA EOR exams and scores for the PANCE were available for all students in the class of 2014 for all three programs, overall N = 134. SPSS version 21 was used for descriptive and inferential data analysis.

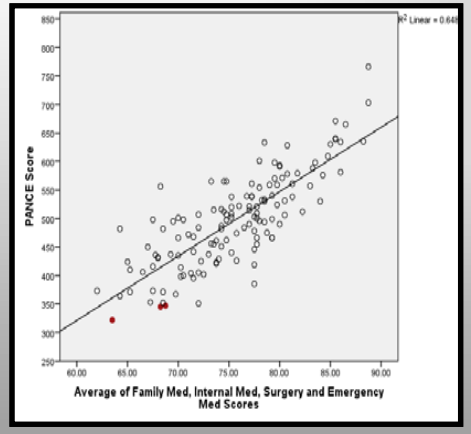
Results

EOR Exam	N	Mean	Std. Deviation	Pearson Correlation with PANCE*	Value of alpha if item is removed
Internal Medicine	134	76.10	8.45	.68	.844
Surgery	134	75.64	6.00	.66	.847
Family Medicine	134	77.64	6.75	.64	.850
Pediatrics	134	76.46	6.22	.61	.852
Psychiatry	134	75.63	5.59	.47	.872
Emergency Medicine	134	72.60	7.24	.66	.846
Women's Health	134	74.28	5.67	.57	.855

Descriptive statistics, Pearson Correlations with PANCE, and Cronbach's alpha if item is deleted, for each of the seven version 1 PAEA end-of-rotation exams. (*p < .0005 for all values)



Scatterplot of the 7-item EOR exam average and PANCE Score (red = PANCE failure)



Scatterplot of the 4-item EOR exam average and PANCE Score (red = PANCE failure)

Results

- RELIABILITY: Cronbach's alpha = 0.871 for the seven EOR exam scores
- CORRELATIONS with PANCE: 0.47 – 0.68
- SIMPLE REGRESSION: R = 0.810; adjusted R^2 = 0.654 (the 7-item EOR exam average explains ~65% of PANCE score variance)
- RECEIVER OPERATING CHARACTERISTIC (ROC) analysis: area under the curve (AUC) = 0.975 for 7-item average (p = .005)
- SENSITIVITY and SPECIFICITY: a cut-off score of 68.9 on the 7-item exam average had a sensitivity = 100% and specificity = 94% for identifying students who failed the PANCE

Conclusions

This study provides solid evidence for both the reliability of the composite seven-item EOR score, and for the validity of using this composite score for the assessment of general medical knowledge in clinical PA students for the purpose of predicting whether their knowledge base is adequate to pass the PANCE. Future research with increased sample size across multiple exam versions is needed to see if statistical correlations remain consistent.

References

Downing SM. Reliability: on the reproducibility of assessment data. *Med Educ.* 2004;38:1006-1012.

Sullivan GM. A Primer on the Validity of Assessment Instruments. *J Gen Intern Med.* 2011; 3(2):119-120.

Massey SL, Lee L, Young S, Holmerud D. The Relationship Between Formative and Summative Examination and PANCE Results: A Multi-Program Study. *J Physician Assist Educ.* 2013;24(1):24-34.

Massey S, Stallman J, Lee L, Klingaman K, Holmerud D.The Relationship Between Formative and Summative Examinations and PANCE Scores; Can the Past Predict the Future? J Physician Assist Educ. 2011;22(1):41-45.

Ennulat CW, Garrubba C, DeLong D. Evaluation of Multiple Variables Predicting the Likelihood of Passage and Failure of PANCE. J Physician Assist Educ. 2011;22(1):7-18.