A model to predict student performance on the Comprehensive Osteopathic Medical Licensing Examination (COMLEX) Level-I based on the Medical College Admission Test (MCAT), undergraduate grade point average (GPA), and osteopathic medical school GPA

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INTRODUCTION/BACKGROUND

This study investigated the relationship of pre-matriculation and academic variables to performance on COMLEX-I at a single osteopathic medical school. Academic performance and academic ranking as well as the variation in performance by the number of testing attempts was identified to explore key points for early intervention.

When identifying students at risk for poor performance on high stakes exams, it is critical to focus on early identification for intervention. Though, prior studies have established a positive association between undergraduate GPA, MCAT, Year 1 medical school GPA and COMLEX-I performance, there is still discussion and debate regarding strength of prediction.

HYPOTHESIS

There is a positive association between undergraduate GPA, MCAT, medical school 1st year GPA and COMLEX-I performance. The association will differ by number of testing attempts and academic performance ranking.

METHODS

This study included a retrospective review of student academic data from 2009-2013. Descriptive statistics included frequency, mean and standard deviation, identifying variables by gender and by cohort year. Bivariate correlations and linear regression explored associations and the ability of variables to predict COMLEX-I performance. Linear regression also investigated the top and bottom 25% of each cohort year.

Independent Variables
- Number of undergraduate institutions attended
- GPA (Undergraduate): cumulative & science
- MCAT: 1st attempt, highest score & the number of times taken
- GPA (Med school): 1st year cumulative & spring semesters (1st yr., 2nd yr.)
- COMLEX-I number of times taken

Dependent Variable
COMLEX-I score.

RESULTS

1263 student academic records were reviewed with (43.5% female; 56.5% male) from 2009-2013 (table 1). Undergraduate GPAs demonstrated no significant gender differences with cumulative GPA (r=0.35, SD=281) and science GPA (r=0.52, SD=295) (table 2). 85% of students took the MCAT 1-2 times and 15% took the MCAT ≥3 times (figure 1). Mean scores included, 1st MCAT (F=24.43, SD=3.62) and highest MCAT (X=26.11, SD=2.78) (table 2). Medical school means included 1st Year GPA (r=0.30, SD=571), 1st year spring GPA (r=0.34, SD=501), and 2nd year spring GPA (r=0.35, SD=453).

Significant Regression Models:
Linear regression model used predictor variables 1) cumulative undergraduate GPA; 2) 1st MCAT and; 3) 1st year GPA, with the dependent variable COMLEX-I (figure 2, table 4). A significant proportion of the total variation in COMLEX-I was predicted by the model. All three variables were statistically significant predictors at ≤0.05 p-value and the model accounted for 61% of the variance in COMLEX-I (r2=0.61, p=0.000), R=0.41. Small negative associations were found between number of COMLEX-I attempts and 1st year GPA; undergraduate cumulative GPA; science GPA; and COMLEX-II (table 3). Small negative associations were also found between number of MCATs taken and (medical school GPA; highest MCAT; and COMLEX-II) (table 5). All associations were statistically significant at ≤0.05 p-value. However, the number of MCAT and COMLEX-I test attempts, along with the number of colleges attended were not found to be significant in regression models to predict COMLEX-I.

A second linear regression model focusing on the top and bottom 25% of each class year student cohort used predictor variables 1) first MCAT 2) 1st yr. GPA with the dependent variable COMLEX-I accounted for 82% of variance in COMLEX-I, r2=0.82, p<0.000.

DISCUSSION/CONCLUSIONS

This study validates previous studies supporting associations between undergraduate GPA, MCAT, medical school GPA and COMLEX-I performance. In addition, “first” MCAT was identified as a stronger early predictor of future performance than average or highest MCAT. This is important as multiple MCAT’s are often accounted for, but medical school admission focus remains on the highest score for future performance. The number of MCATs taken were associated with lower MCAT, lower medical school GPA and were minimally associated with lower COMLEX-I scores. Furthermore, this relationship strengthened for students performing in the top and bottom 25% of their class. Using predictors of performance can reduce barriers and facilitate early intervention for at risk students. It will be interesting to continue investigation with the new MCAT to compare its utility and value as a predictor of later performance. Regardless, providing medical schools with a method to identify and provide additional targeted support is essential. It can serve as a tool to potentially increase later performance COMLEX-I and other high stakes exams required for continued success in the medical profession. The results of this study are limited as it only includes data from a single osteopathic medical school.