Comparing performance of first year and second year medical school students based on competency-based testing in a new medical school curriculum

Abstract

This study assessed new medical school curriculum on improving medical school students' Comprehensive Basic Science Exam (CBSE) [1] scores. We found that after one year in the new curriculum, the second year medical students had significant higher CBSE scores comparing with first year students while their improvements are comparable.

Background

The Michigan State University College of Human Medicine launched new curriculum, Shared Discovery Curriculum (SDC), in August of 2016. To measure student progress, the SDC utilizes a comprehensive suite of assessments that includes a locally developed multiple-choice exam, the National Board of Medical Examiners (NBME) Comprehensive Basic Science Exam (CBSE).

Methods

Early Clinical Experience (ECE) starts the first year of medical school and constitutes the first 24-week segment of the medical school curriculum. The Middle Clinical Experience (MCE) starts the second year of medical school and constitutes the 30 weeks segment of the medical school curriculum. In the MCE, students expand the skills learned in the ECE to prepare themselves to be a member of interprofessional teams and gain further mastering of the clinical applications of basic science materials.

Both ECE and MCE Students were assessed using two CBSE test scores given in the beginning of Fall and Spring semester of academic year 2017-2018. First, we used linear regression model for two administrations of CBSE tests to compare ECE versus MCE students' performance controlling for confounding factors such as age, gender, race and MCAT. Next, we compared the improvement from second CBSE scores to first CBSE of the two-year medical students by adding interaction term in the regression model.

Results

There are 191 ECE students and 183 MCE students in SDC curriculum. Complete data was available for 186 ECE students and 158 MCE students. As noted, the missing test scores were estimated using imputation. For the first CBSE test, the mean for ECE and MCE class are 36.94 (s.d.=5.04) and 54.66 (s.d.=8.18) respectively and regression result shows that the performance of MCE is significantly better than ECE students ($p<0.001$). In the second CBSE test, the mean for ECE and MCE class are 47.09 (s.d.=6.21) and 64.95 (s.d.=10) respectively. Still regression result shows the performance of MCE is significantly better than ECE students ($p<0.001$).

We further investigated improvement of CBSE scores between ECE and MCE students by adding interaction term, time over class year, in previous linear regression model. The coefficient of interaction term is 0.133 with p-value=0.904. This indicates MCE students' improvement on CBSE score is higher than ECE students but the difference is not significant. The overall improvement of CBSE for both classes students is 10.16 with p-value<0.001.

Conclusion

As we expected, over one year of new curriculum, our MCE students performed significantly better than ECE students in CBSE tests while their improvement are comparable. Both classes also showed significant improvement in performance in CBSE across the two semesters suggesting the new curriculum is effective in supporting our students' learning in this critical area.

Reference:

1. CBSE