



Short Communications

Predictors of student performance on the Pharmacy Curriculum Outcomes Assessment at a new school of pharmacy using admissions and demographic data



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ABSTRACT

Objectives: To characterize student performance on the Pharmacy Curriculum Outcomes Assessment (PCOA) and to determine the significance of specific admissions criteria and pharmacy school performance to predict student performance on the PCOA during the first through third professional years.

Methods: Multivariate linear regression models were developed to study the relationships between various independent variables and students' PCOA total scores during the first through third professional years.

Results: To date, four cohorts have successfully taken the PCOA examination. Results indicate that the Pharmacy College Admissions Test (PCAT), the Health Science Reasoning Test (HSRT), and cumulative pharmacy grade point average were the only consistent significant predictors of higher PCOA total scores across all students who have taken the exam at our school of pharmacy.

Conclusion: The school should examine and clarify the role of PCOA within its curricular assessment program. Results suggest that certain admissions criteria and performance in pharmacy school are associated with higher PCOA scores.

Introduction

The Pharmacy Curriculum Outcomes Assessment (PCOA) is a national standardized examination that was developed by the National Association of Boards of Pharmacy (NABP). The PCOA is designed to be a comprehensive assessment instrument for pharmacy schools to measure the academic progress of pharmacy students.¹ The current examination is composed of 225 questions

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that are designed to mirror the curriculum hours of Doctor of Pharmacy (PharmD) programs in the United States as outlined by the Accreditation Council for Pharmacy Education (ACPE) Standard 12.^{1,2} The content of the PCOA examination is divided among four distinct domains: basic biomedical sciences (16%); pharmaceutical sciences (30%); social, behavioral, and administrative sciences (22%); and clinical sciences (32%).^{1,3}

Recent research has suggested that assessment data generated from the PCOA may provide a reliable means for a school of pharmacy to evaluate the effectiveness of its program compared to other schools that also use the PCOA.³ In addition, one study found that performance on the PCOA is significantly correlated with student performance both in courses and on the North American Pharmacist Licensure Examination (NAPLEX), which is a criterion-based examination designed to determine whether a student possesses the minimum content knowledge necessary to practice pharmacy.^{3–5} This correlation is important, because NAPLEX pass rates are often associated with program quality and are required to be publicly disclosed by all pharmacy programs per ACPE Standards 2016.² It is also expected that the PCOA and the NAPLEX are correlated, because the National Association of Boards of Pharmacy (NABP) designed both the PCOA and the NAPLEX. Previous research has found that Pharmacy College Admission Test (PCAT) scores, pre-pharmacy course grades, pre-pharmacy grade point average (GPA), personal interview scores, Health Sciences Reasoning Test (HSRT) scores, and a prior four-year college degree are all indicators of success within PharmD programs.^{6–16} Similarly, other data utilizing large samples of students have shown that the PCAT is positively correlated with success in pharmacy school as well as NAPLEX score.^{17–19} Whether similar factors can be used to predict student performance on the PCOA is not well understood. To our knowledge, only a single study has examined the correlation between PCOA and NAPLEX performance. This work was limited in nature as only one school was examined.⁴ It is not known if a similar correlation exists at other institutions. Bearing this in mind, and because the accreditation standards now require the submission of P3 student PCOA scores to ACPE, this study was designed to determine the significance of specific admissions criteria and student performance in the curriculum as predictors of PCOA performance during the first professional year (P1) through the third professional year (P3).

Methods

The Marshall University Institutional Review Board approved this study. All students at Marshall University School of Pharmacy (MUSoP) are required to complete the PCOA exam annually, beginning with the P1 through P3 year. MUSoP generates the revenue in order to provide this exam to each student with a student fee that each student pays at the beginning of the school year.

Starting in 2013, all enrolled P1 through P3 students at MUSoP were required to take the PCOA in January. The decision was made to administer the PCOA as early as possible in the semester before any course exams were scheduled so students could focus more on the PCOA. First-year students are only tested on one semester's worth of material. Students who do not take the PCOA because of an unexcused absence receive a professionalism evaluation form (PEF), which goes into their permanent record. Students who receive an excused absence are allowed to take the examination at a later date. Furthermore, the PCOA is low stakes and students are reminded that the scores will not be used for progression or in any specific course.

In each fall semester, all enrolled students are introduced to the PCOA during a town hall meeting. Administration discusses the length of the examination, how the results are used and disseminated to each student, and class incentives. To encourage student effort in the most recent administration (2015), each student in the P3 cohort was eligible for a prize consisting of Marshall University items (\$50 value) and a free NAPLEX review book (\$170 value) if (s)he scored at or above the 35th percentile nationally. The top 30 students in the P1 class were given priority in ranking their P2 introductory pharmacy practice experience (IPPE) sites. The top 30 students in the P2 class were able to be the first to rank their P3 IPPE sites. Students were e-mailed a reminder about the PCOA as well as a web site with a practice examination approximately two weeks prior to taking the PCOA, which was then administered within the first few weeks of the spring semester. No direct incentives were offered to students during the 2013 and 2014 administrations of the PCOA.

Student admissions assessments

Each student's PCAT score was analyzed as a continuous variable. A dichotomous variable, baccalaureate degree, identified whether or not a student had attained at least a bachelor's level degree (1) or less than a baccalaureate degree (0) prior to entering the PharmD program. To be admitted to the program, all students must complete at least two years of undergraduate pre-requisite coursework (approximately 60 hours). A baccalaureate degree is not required for admission. Pre-requisite courses include at least one semester each of statistics, calculus, anatomy, physiology, and microbiology. Students must also complete at least two semesters each in English composition, general biology with lab, general chemistry with lab, organic chemistry with lab, and physics with lab.

MUSoP uses a holistic interview process to assess if a student will be successful in the program. Students are administered a standardized behavioral interview (SBI) with a faculty–student pair to assess integrity, leadership abilities, and ability to communicate effectively, a writing assessment, the HSRT, and a group dilemma. Each of the interview day assessments is scored on a 100-point scale, and each is discussed later. All aspects of the admissions process (GPA, PCAT, SBI, HSRT, etc.) are equally weighted in the construction of the final student–candidate score.

The SBI is a series of seven prompts that are asked by a faculty–student pair to each interviewee. The prompts address include (1) initiative; (2) teamwork and building relationships; (3) integrity; (4) problem solving/resolution; (5) decision-making; (6) planning, organizing, and time management; and (7) leadership. The faculty–student pair introduces each prompt and gives the interviewee a definition of the prompt. The faculty–student pair independently rates the interviewee for each domain using a standard rubric consisting of a 5-point Likert scale (1 = significant development needs, 2 = development needs, 3 = solid, 4 = strength, and 5 = clear

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