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Currents in Pharmacy Teaching and Learning 6 (2014) 798–806

Currents
in Pharmacy
Teaching
& Learning

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Research

The methodology for the early identification of students at risk for failure in a professional degree program

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Abstract

Objective: A 2013 mandate for publicly posted progression rates has focused attention on pharmacy attrition rates. This study describes a process to systematically identify reasonably valid indicators of students who are likely to fail to progress. The primary objective was to develop a methodology to discover a variable or model of variables that would identify students at risk for failure prior to the end of the second semester.

Methods: The marker selected to represent failure was failure to graduate within four years from matriculation. Variables from Wingate University's pre-pharmacy admissions data such as Pharmacy College Admissions Test (PCAT), grade point averages, and interview scores combined with first-year pharmacy school academic performance on tests and grades were analyzed for 398 students matriculated between 2004 and 2009. The data were analyzed using correlations, binary logistic regression, and cross-tabulation. Odds ratios were computed.

Results: Of these students, 22 failed to graduate or failed to graduate on time. The strongest indicators that these students would eventually fail to graduate on time was their score on the first exam in an integrated science course (odds ratio = 6.1), the first semester course grade in the same course (odds ratio = 18.8), their semester one grade point average (GPA) below 3.0 (odds ratio = 17.6), and their semester two cumulative GPA below 3.0 (odds ratio = 35.8).

Conclusion: A professional pharmacy program can use readily available data and a scientifically sound methodology to identify students who are at a significantly higher risk for failure to graduate on time.

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Keywords: Assessment; Predictors of failure; Pharmacy College Admissions Test (PCAT)

Introduction

Accreditation Council for Pharmacy Education (ACPE) Accreditation Standards require that all schools of pharmacy post on-time progression rates on their public websites as of January 1, 2014. A memorandum sent to all Deans of ACPE-accredited Doctor of Pharmacy Programs on August 20, 2013, by the Assistant Executive Director J. Gregory Boyer PhD highlighted this requirement. The memorandum

clearly states that all ACPE-accredited pharmacy programs must include the following information on its website:

The on-time graduation rate for the most recent graduating class in the single degree pathway, i.e., the percentage of a class cohort completing the curriculum in the specified time frame (three calendar or four academic years).

Given this duty to report, it can be assumed that schools will be required to not only track this data but also to develop methods to remedy any deficiency in progression rates that may occur at the institution. A crucial element of any valid progression policy must be the early identification of students at risk of failure. This research attempts to

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systematically identify a reasonably valid early predictor of pharmacy students who are likely to not graduate or fail to graduate on time. It is hoped that this methodology may inspire other programs to develop their own early identification procedures with the goal of improving student progression and retention rates for their own institutions.

The American Association of Colleges of Pharmacy (AACP) 2011–2012 profile of students reports that the number of applications submitted to first professional degree programs at schools and colleges of pharmacy decreased by 8.1% for schools reporting data for both the 2011 and 2012 academic years.¹ This profile also states that total enrollment for all programs rose 4.5% during that same time frame, while the attrition rate for the Class of 2012 was 10.2%. The number of high-school graduates in the United States peaked in 2011 and is not projected to reach the same level until 2024. This could result in less demand for graduate program seats through 2028.² The trend of less applications competing for more seats could potentially lead to more students being enrolled in pharmacy programs from the applicant pool who may not have been enrolled in the past. While one can logically debate whether this necessarily dilutes the quality of the applicant pool below an acceptable threshold, it would be difficult to argue that it will increase the quality of the first-year (P1) enrollees. Barring any significant changes in the number of quality applicants or a reduction in the number of available seats, it would seem prudent to improve the ability to identify students at risk as early as possible and to develop strategies to assist them in successfully completing the pharmacy program on time.

Kimberlin et al.³ considered various academic and personality variables to predict performance in clinical and basic science coursework and found that the pre-pharmacy grade point average (GPA) was the best. Houglum et al.⁴ suggested that the best variables for predicting failure in a pharmacy program included the American College Test (ACT) and the organic chemistry grade. Sansgiry et al.⁵ reviewed test competency compared to a GPA greater than 3.0 as a predictor. Lobb et al.⁶ studied predictors of first semester and first-year performance but found none more useful than the overall pre-pharmacy GPA and Pharmacy College Admissions Test (PCAT). Many potential predictors, such as the Learning and Study Strategies Inventory (LASSI), Defining Issues Test (DIT), and the Watson-Glaser Critical Thinking Appraisal (WGCTA), were not found to be significant. Studies by Chisholm et al.⁷ and later by Renzi et al.⁸ both looked at predictors of first-year performance by pharmacy students and found math and science pre-pharmacy GPA as well as a previous four-year college degree useful. While several studies have attempted to predict academic success,^{9–18} Schauner et al.¹⁸ suggest that academic progression committees should focus on early program coursework when trying to optimize retention. Preventing failure would not only aid the student in their quest to become a licensed professional but would resonate with both the educational mission of the degree granting institutions and the ACPE requirement to report progression

data to the public. These authors believe that the most mission critical indicator of academic failure is: Did the student graduate on time with his/her entering class?

The recent national attrition rate of approximately 4.3% for all causes suggests that the current process for the selection of Doctor of Pharmacy students approaches 95.7% accuracy for graduation from an accredited program.¹⁹ In addition to this small percentage of graduates who fail to complete the program, approximately 6.9% of enrolled degree candidates graduate later than their P1 entering class cohort. With 14,011²⁰ first-year students enrolled in PharmD programs nationwide each year, losing 4% to attrition amounts to a significant economic and humanistic toll on 560 students. Owing to the previously mentioned enrollment and application trends, the national attrition rate could be expected to rise in the near future.

The opportunity cost of losing these students is substantial in not only lost revenue for the academic institutions but the accumulated cost of academic loans for candidates who fail to progress appropriately. According to the results of the response for all participating schools of pharmacy on the AACP 2013 graduating student survey, 90.9% of students borrowed money to complete their PharmD degree. The average amount a student has borrowed based on the national average for all schools is \$133,694.²¹ Every 1% increase in attrition will impact ~140 additional students. These student losses represent unrecoverable revenue for the pharmacy schools once a dismissal has occurred. If valid early indicators of failure can be discovered, they could be used to more carefully select incoming students but more importantly, to identify students at risk of failure early enough in the program to prevent them from failing to complete the program.

Methodology

Study objectives

The primary objective of this study was to develop a methodology to identify a significant indicator(s) of student likelihood to fail to complete a pharmacy degree program or complete on time. Preference was given to uncovering indicators that were available by the end of the first semester of an eight-semester professional degree program. The secondary objective was to develop data that could inform the admissions, academic standards, and student progression policies of the school with evidence-based decision-making tools. This study was approved by the Wingate University Research Review Board. Historical data were collected on all students who had entered the PharmD program at Wingate University School of Pharmacy between 2004 and 2009. The data were analyzed using SYSTAT13 for Windows software (SYSTAT software, Chicago, IL).

Institutional characteristics

Wingate University is a private university, not affiliated with a medical school, with total enrollment of

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