Review Article

Predicting performance in health professions education programs from admissions information – Comparisons of other health professions with pharmacy

Richard E. Wilcox*, Kenneth A. Lawson

College of Pharmacy, University of Texas at Austin, Austin, TX 78712, United States

A R T I C L E   I N F O

A B S T R A C T

Background: The goal of the present review was to assess the state of performance prediction in healthcare programs generally, versus performance prediction in pharmacy schools, using didactic and non-didactic admissions measures. This is important because clinical success represents a combination of skills that are not fully predicted by either type of measure alone.

Methods: PubMed searches were conducted focusing on work published from 2000 onwards, since it is during this period that non-didactic admissions measures have come to be incorporated into the applicant evaluation process. Relevant free full text papers available were used. When these papers were not available by direct import into EndNote, we went directly to the journal to try to retrieve the paper.

Results: We acknowledge that health professions programs have been successful in recruiting excellent candidates into their schools. However, based on the modest amount of healthcare program performance accounted for by didactic measures, admissions committees should consider expanding their holistic evaluation of applicants. Schools would benefit from using two-step screening phases in the application process – perhaps evaluating didactic potential in phase 1 and experiential in phase 2. Using combination measures throughout the admission process should help ensure admission of students more likely to be successful throughout their healthcare practice.

Implications: Future investigations of the prediction of healthcare program performance by formal combinations of didactic and non-didactic admissions measures are imperative. In addition, it is likely that combination admission measures will incorporate more metrics of critical thinking than do simpler approaches. Furthermore, systematic evaluation of the usefulness of the two-step screening approaches to admissions used by most competitive health professions programs also needs to be done.

Background

Today in healthcare education, there is a high priority to make programmatic improvements by utilizing admissions resources most effectively. But what does "most effectively" actually mean? Ultimately, admissions committees' desire that applicants accepted into a healthcare professional program will become leaders in their respective areas of healthcare, providing innovation and continually improving health outcomes for their patients. Furthermore, health professions educators acknowledge the importance of

critical thinking (CT) in clinical decision-making (CDM). This implies that admissions programs should include this quality in their admission metrics. Thus, accepting the right people into professional training is crucial. Because of the large number of applicants per program, the admissions process is more and more being divided into two phases – an early and a late screen phase. These phases often emphasize different applicant attributes. The value of such approaches overall and of the individual qualities measured during the admission process has yet to be determined.

Research over the last several decades has shown that academic achievement in pre-professional training is an essential predictor of success in later professional practice, but a very incomplete one. How well pre-professional grade point average (GPA), even when combined with achievement test scores, predict academic performance in early health professional didactic coursework is reasonably understood. However, the extent to which these pre-professional measures predict success in clinical coursework and beyond seems to be less clear. While GPA often measures success in professional healthcare programs, the same numerical GPA may mean very different things depending on the rigor of the particular pre-professional program. Furthermore, how well pre-professional non-academic measures (including such factors as work experience, motivation, characteristics of personality) predict early didactic performance or later experiential success in the health professions has been much less studied. For example, Latif[1] noted that there was, overall, only a modest relationship between didactic admissions markers of GPA and PCAT and overall pharmacy school performance. Other literature in the subsequent decade has reinforced this conclusion.[2–9]

It is accepted that success as a clinical practitioner in any health profession requires solid CT skills, yet CT has not been formally assessed by many admissions committees. It has been assumed that surrogate measures for CT can be found in GPA and achievement test scores. However, only a few studies to date have actually examined the correctness of this assumption. A variety of non-didactic measures have also been utilized in the admissions process because of their perceived value and to offset the limitations of didactic measures.[10–12] Multiple mini-interviews (MMI) are among the most exciting approaches.[13–17] The MMI likely taps aspects of critical thinking similar to those in the objective structured clinical examination (OSCE) from which it was originally derived.[13–16]

Overall, it seems timely to evaluate the literature on prediction of academic and experiential success in health professions programs using pre-professional academic and other measures. In the present review, we have placed a special emphasis on results found for the profession of pharmacy versus other health professions. Our first goal was to determine the extent to which academic and other pre-professional measures, used as a part of the healthcare professional education admission process, are able to predict later academic and experiential performance. A second goal was to determine whether any current standard admissions measures assess CT. A final goal was to determine the extent to which two-step admissions approaches, consisting of an initial screening followed by more in-depth evaluation of selected candidates, has been formally evaluated and shown to be effective.

Methods

To accomplish these goals, we reviewed the literature included in PubMed related to academic achievement/admissions in healthcare education for medicine, dentistry, nursing, pharmacy, and physical therapy. We relied on publications since 2000, because this is the period during which non-cognitive measures have seen more widespread use in admissions. We also focused on free full-text citations. Specifically, the searches using the terms < admissions criteria > plus < specific type of health profession > yielded a set of 251 papers.

Below, we have provided a brief overview of admissions variables, evaluated the literature on didactic performance predicted by didactic and non-cognitive admissions measures in non-pharmacy health professions versus pharmacy, and then experiential performance predicted by didactic and non-cognitive admissions measures in non-pharmacy health professions versus pharmacy. Throughout these sections, we have tried to address research on critical thinking skills and on two-step admissions procedures where these have been present. It is important to acknowledge that many programs have adopted holistic approaches to applicant evaluation including both cognitive and non-cognitive measures; some of them use a two-step process to do so. Clearly, the high quality of health professions practice suggests that admissions committees have generally been successful. Nevertheless, the proportion of variance in performance accounted for by these measures is modest. The challenge is to elucidate what combination of factors work best for particular schools and particular types of students in order to establish trends. We also have formed some tentative conclusions about the extent to which various admissions measures predict later health professions curricular success. Significantly, there is now an appropriately enhanced emphasis on professional collaboration and interprofessional practice experiences in pharmacy student training that must be reflected in the admissions process. This highlights the considerable value of non-cognitive measures such as multiple mini-interviews.

Admissions variables overview – use of didactic measures: non-pharmacy

A key to success in the health professions is critical thinking and one useful measure has been the California Critical Thinking Skills Test (CCTST), shown in Fig. 1 Table 1).[18] Noohi et al.[19] evaluated critical thinking (CT) via the CCSTST and CDM, via the Lauri and Salantera[20] instrument in four campuses of Kerman University in India. Nursing students scored low on CT with moderate performance on CDM. Heidari and Ebrahimi[21] evaluated the relationship between decision making in emergency medicine students and critical thinking via the CCTST in Shahrekord, Iran. The authors observed that both CT and CDM were poor in these students, although there was a significant correlation between the two. Kothe et al.[22] used the Hamburg selection test (HAM-Nat test) to determine if it explained additional variance over GPA in dental applicants. The HAM-Nat test was found to account for 12% of the variance in preclinical examination scores. The authors determined that the test yielded a significant improvement in prediction of preclinical academic success for dental students.[22] Von Bergmann et al.[23] asked if the Myers-Briggs Type Indicator (MBTI) would be