

Validity of Selected Parameters as Predictors of Success in a Nuclear Medicine Technology Program

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A significant amount of data is accumulated on applicants when they apply to a nuclear medicine technology program. Students are chosen for a program based on the available data with the anticipation that they will succeed. With more non-traditional applicants, the often used Scholastic Aptitude Test (SAT) or American College Testing (ACT) examination may not be valid because of the length of time between the examination date and application to a program. Therefore, it is important to assess the validity of various other parameters that could predict success.

The literature discusses potential indicators of success. Success was defined by most authors as grade point average (GPA) in the program, either after the first year or at graduation. Jensen (1) also included graduation status and national board results in his definition of success.

One study of engineering students found that success involved the multiple predictors of GPA, SAT, ACT, interest inventories, and personal interviews (2). Another study involving engineering students found academic performance correlated highly with ACT scores and prior college GPA (3). Specifically, in allied health, studies have been performed to assess the predictive ability of the Allied Health Professions Admission Test (AHPAT). Katzell (4) studied the AHPAT results of allied health students in 15 different colleges. She found significant correlations among the AHPAT, prior college GPA, and GPA in the program. Other authors (5) also found significant correlations but felt the AHPAT did not increase the amount of information over what was already available with ACT or SAT scores. On the other hand, Leiken and Cunningham (6) concluded that the AHPAT was useful because SAT or ACT scores were not available on all applicants. Another study by Jensen (1) examined various predictors of success (such as prior college GPA, ACT, age, gender) in several allied health programs. He did not find any common predictor throughout all the programs.

With this conflicting information, my colleagues at the University of Nebraska Medical Center in Omaha, Nebraska and I looked at the success of our nuclear medicine technology

program. Since 1976, we have used prior GPA, GPA obtained on prerequisites only, and ACT composite scores as informal standards for admission. We did not have any suitable validity data for any preadmission criteria. Therefore, in 1982, we examined prior college GPA, GPA on prerequisites only, ACT composite scores, and scores on a national allied health examination to determine their validity in predicting success in the program. Success was defined as one or more of the following: completing the first 6 mo of the nuclear medicine technology program, completing the entire 24 mo of the program, or passing the Nuclear Medicine Technology Certification Board (NMTCB) examination.

The purposes of this study were to determine the correlation between possible predictors of success and the six-mo GPA in the nuclear medicine technology program, the 24-mo GPA in the nuclear medicine technology program, and scores on the NMTCB examination. We also wished to determine if there was a need to use all of the possible predictors in student selection.

MATERIALS AND METHODS

All qualified applicants to our nuclear medicine technology program from 1982 through 1990 were given an allied health admissions test, the Psychological Services Bureau Health Occupations Aptitude Examination (PSB), at no cost to the applicant. The exam is standardized with separate norms for nuclear medicine technology. The PSB examination is timed and covers five general areas. Academic aptitude is taken first, consisting of 30 verbal, 30 arithmetic, and 30 nonverbal questions, intermixed in ascending order of difficulty. Thirty min is given to complete this section. During the next 15 min, the correct spelling of 60 medical terms is determined. Reading comprehension is assessed by answering questions over a series of written passages in 15 min. Ninety multiple choice questions on natural science constitute the next 30 min. The last area is vocational adjustment consisting of 105 statements with which the respondent agrees or disagrees (7).

Preenrollment information consisting of PSB examination results, ACT scores, total prior college GPA, and prerequisite college GPA were collected on all applicants although data were missing on selected applicants.

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Pearson product moment correlations were computed and tested for significance between the 6-mo GPA and the preenrollment information and between the 24-mo GPA and the preenrollment information. NMTCB scores were correlated with preenrollment information and 6-mo and 24-mo GPAs.

Student-t tests were performed to assess if the ACT scores, PSB values, prior college GPA, and prerequisite GPA were statistically different between the successful students and the unsuccessful students (those not meeting the success criteria), as well as between the accepted versus nonaccepted individuals.

RESULTS

Forty-seven applicants were assessed. Tables 1, 2, and 3 show the results of the correlations between the successful students and the various parameters. Students who successfully completed their first 6 mo of the nuclear medicine technology program were found to have significant correlation coefficients between their GPA in the program and the spelling and natural science areas of the PSB ($p < 0.05$) and with their prior college GPA and prerequisite GPA ($p < 0.01$). However, students who completed the entire 24 mo of the program had significant correlations between their GPA in the program and their prior college GPA and prerequisite GPA ($p < 0.001$).

All students completing the program passed the NMTCB examination. Their NMTCB scores were found to correlate significantly with their 24-mo GPA ($p < 0.001$); ACT score; prerequisite GPA and 6-mo GPA ($p < 0.01$); academic aptitude and reading comprehension scores on the PSB; and prior college GPA ($p < 0.05$). It should be noted that there are a different number of subjects for various correlations because of incomplete data on some individuals.

There was a significant difference, utilizing the student-t test, between the successful and unsuccessful students only in the academic aptitude portion of the PSB exam ($p < 0.02$). Between accepted and not-accepted students there were significant differences in the ACT scores ($p < 0.01$), academic aptitude portion of the PSB ($p < 0.10$), reading comprehension portion of the PSB ($p < 0.01$), prior college GPA ($p < 0.02$) and prerequisite GPA ($p < 0.10$).

TABLE 1. Correlation Between GPA and PSB Categories for Successful Students

	6-mo GPA*	24-mo GPA†
Academic Aptitude	.289	.352
Spelling	.391 [‡]	.246
Reading Comprehension	.347	.297
Natural Science	.425 [‡]	.262
Vocational Adjustment	-.197	-.195

* n = 28.
† n = 25.
‡ p < 0.05.

TABLE 2. Correlation Between GPA and Performance Predictors for Successful Students

	6-mo GPA*	24-mo GPA†
ACT Composite	.230	.267
Prior GPA	.617 [‡]	.677 [§]
Prerequisite GPA	.560 [‡]	.785 [§]

* n = 24.
† n = 22.
‡ p < 0.01.
§ p < 0.001.

TABLE 3. Correlation Between NMTCB Scores and PSB Categories as Successful Performance Predictors

	NMTCB*
ACT	.687 [‡]
Academic Aptitude	.575 [†]
Spelling	.477
Reading Comprehension	.501 [†]
Natural Science	.422
Vocational Adjustment	.174
Prior GPA	.530 [†]
Prerequisite GPA	.635 [‡]
6-mo GPA	.709 [‡]
24-mo GPA	.751 [§]

* n = 17.
† p < 0.05.
‡ p < 0.01.
§ p < 0.001.

DISCUSSION

Although significant correlations were obtained among GPA, NMTCB scores, and portions of the PSB examination, there was no consistency or high significance. There seem to be consistent and significant correlations between GPA in the program and academic college grades obtained prior to entering the program. There was no significant difference between successful and unsuccessful students on nonPSB items but there was significance at the 0.02 level on the PSB academic aptitude. Factors other than those analyzed probably contributed to these students' lack of success in the program.

The significant correlation between the 24-mo GPA and the NMTCB scores follows the prior correlations. The use of the PSB examination as a valid predictor of success is not warranted for this nuclear medicine technology program.

For this study, the prior college GPA was the most valid predictor of 24-mo success in the program. It verifies the saying that success breeds success.

There were a number of significant differences between the accepted versus nonaccepted individuals. This indicates that

although the PSB examination information was not utilized for student selection, admission decisions did differentiate the two groups of students, and selections were not made by chance.

It also appears reasonable that the information already available to admission officers in our nuclear medicine technology program is sufficient to identify successful students and additional preadmission tests are not necessary. An applicant to our program can best be assessed from prior college GPA information.

Since the sample size was small and there are many extraneous variables involved in the selection of students and completion of a program, these conclusions cannot be extrapolated to any other program or group of students. However, expanding the study to include more students from a number of nuclear medicine technology programs with heterogeneous composition may give the study external validity. We urge other nuclear medicine technology programs to conduct their own validity studies to assure that current admission criteria are valid predictors of success.

In conclusion, preadmission parameters were examined for their validity in a nuclear medicine technology program. We found that a preadmission test, the PSB, did not offer enough additional information to be used as a predictor of success in

the program. Prior college GPA and prerequisite GPA correlated significantly ($p < 0.01$ and $p < 0.001$) with a student's 6-mo and 24-mo GPA in the program. Success on the NMTCB examination correlated significantly ($p < 0.001$) with the 24-mo GPA. We concluded that a preadmission test was not required and that the student's prior college GPA was a sufficient indicator of success.

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