

RESEARCH ARTICLES

Comparative NAPLEX Performance of Graduates of US Pharmacy Programs Accredited by ACPE Prior to and Since 1992

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Submitted January 5, 2004; accepted October 18, 2004; published February 14, 2005.

Objective. To assess the performance on the standardized licensure examination for graduates from “newly accredited” versus “more established” pharmacy programs.

Methods. The performance of graduates from newly accredited programs (those receiving initial full accreditation since 1992) was compared with graduates of more established programs (those receiving initial full accreditation prior to 1992). North American Pharmacy Licensing Examination (NAPLEX) data for first-time test takers during the May-August window was compared for the years 2000 through 2003.

Results. Small differences in scaled scores and first-time NAPLEX passing rates were found between graduates of newly accredited programs and graduates of more established programs.

Conclusion. These results suggest that the accreditation review process for newly accredited programs is appropriately addressing quality education as related to passage of licensure examinations. Analysis of passing rates and scaled scores in the forthcoming years will be necessary to observe if these trends continue.

Keywords: pharmacy education, accreditation, licensing, NAPLEX

INTRODUCTION

The unprecedented expansion of professional degree programs in pharmacy has raised questions about the quality of instruction at newer colleges and schools of pharmacy.¹ The mission of the Accreditation Council for Pharmacy Education (ACPE) is to assure quality in pharmacy education by evaluating each program against a set of standards that have been established through a profession-wide consensus process. Because the accreditation process focuses on the compliance of an individual program with the ACPE accreditation standards and guidelines,² data available to directly compare the quality of “newly” accredited colleges or schools with more established programs is limited to performance of graduates on the North American Pharmacy Licensing Examination (NAPLEX). Although comparing a small number of newly accredited programs with a larger number of more established programs may not be statistically optimal, it nevertheless could offer some insight into the ability of graduates of newly accredited programs to succeed on the NAPLEX compared to graduates of more established programs. Therefore, in an effort to assess the

quality of instruction at newer colleges and schools of pharmacy, a comparative analysis of NAPLEX first-time passing rates was undertaken.

METHODS

ACPE fosters outcomes assessments that address the accreditation standards. One outcome that can be used as a basis for comparison is the results of graduates’ performance on the NAPLEX. To evaluate whether graduates of newly accredited programs (those granted initial full accreditation since 1992) compare favorably with graduates of more established accredited programs (those granted initial full accreditation prior to 1992) ACPE approached the National Association of Boards of Pharmacy (NABP) for a comparative assessment of NAPLEX results.

NAPLEX data for first-time test takers during the May through August window were extracted from cumulative NAPLEX score files available at NABP for the years 2000 through 2003. First-time NAPLEX test takers who had received their professional pharmacy degrees from colleges and schools of pharmacy in countries other than the U.S. were excluded from the analysis. Mean scaled scores and standard deviations were calculated from graduates’ scores in each group (initial full accreditation prior to 1992 and since 1992) overall and for each

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Table 1. Scaled Scores and Passing Rates for Students Taking the NAPLEX

Programs		May-August 2000	May-August 2001	May-August 2002	May-August 2003
Initially Accredited prior to 1992	Mean	102.0	103.5	103.2	103.7
	SD	14.9	14.2	13.9	13.7
	Passing rate	95.4%	96.8%	96.8%	96.8%
	N (graduates)	4852	4759	5175	5038
	N* (programs)	72	74	73	74
Initially Accredited since 1992	Mean	98.7	101.2	98.6	98.5
	SD	13.3	13.6	14.1	13.7
	Passing rate	96.3%	96.5%	95.3%	92.5%
	N (graduates)	217	283	279	348
	N (programs)	5	6	8	8
Total	Mean	101.9	103.4	103.0	103.4
	SD	14.8	14.2	14.0	13.8
	Passing rate	95.4%	96.8%	96.8%	96.6%
	N (graduates)	5069	5042	5454	5386
	N (programs)	77	80	81	82

*The number of programs varies from year to year in conjunction with the move to the PharmD degree program and the absence of graduates for that year in some programs.

May-August testing window. The year 1992 was chosen as the cut-off as this was the beginning of a period during which acceleration in the number of professional degree programs requesting accreditation was observed following a long quiescent period. The scaled score is a mathematical transformation of the examinee's final ability estimate calculated from his or her performance on the examination. The psychometric model for the NAPLEX is the 3-parameter Item Response Theory (IRT) model. Information obtained from pretesting prospective item bank questions is used to determine the 3 parameters: a question's difficulty, discrimination, and likelihood of being answered correctly by guessing. The 3 pieces of information are used to determine the examinee's "final ability estimate," which is transformed to the scaled score. Therefore, the scaled score is neither a percentage nor the number correct. Scaled scores on the NAPLEX range from 0 to 150, with 75 being the minimum passing score. An analysis of variance was conducted using the students' scaled scores as the dependent variable. Since analysis of variance assumes equal variance across groups, Levene's test of equality was conducted to determine whether the error variance in the scaled scores for the more established group was equal to that for the newly accredited group. In addition, the passing rates of the 2 groups were analyzed using a chi square test of association.

RESULTS

Using 1992 as the cutoff year, the analysis included data from 74 colleges and schools of pharmacy with initial accreditation prior to 1992. Data regarding the per-

formance of graduates on the NAPLEX was available from 8 colleges and schools of pharmacy initially accredited since 1992.

Table 1 presents mean NAPLEX scaled scores and standard deviations for first-time test takers for students graduating from programs initially accredited prior to 1992 and for students graduating from programs initially accredited since 1992. NAPLEX passing rates for the groups are also presented. Mean NAPLEX scaled scores appear to vary overall between the 2 groups, as well as for the 4 testing periods. No differences were observed between NAPLEX passing rates for graduates of programs initially accredited since 1992 and graduates of those initially accredited prior to 1992 for the May-August 2000, 2001, and 2002 test windows. However, the passing rates for graduates of programs initially accredited since 1992 was lower than for graduates of program accredited prior to 1992 for the May to August 2003 testing window. Analysis of passing rates of the programs accredited since 1992 revealed passing rates ranging from 90.6% to 100% for the 2000-2003 time period. The school with the overall passing rate for 2000-2003 of 90.6% had a passing rate of 81.6% for May-August 2003. No other school had a passing rate for first-time candidates below 90% for the May-August period of any year.

Results from the analysis of variance conducted using the students' scaled scores are presented in Table 2. Significant differences were identified between scaled scores of the group newly accredited and those programs that were more established. Significant differences were also found across testing periods.

Table 2. Analysis of Variance of NAPLEX Scaled Scores

Source	Sum of Squares	Degrees of Freedom	Mean Squares	F	P value
Accreditation Group	15605.203	1	15605.203	77.781	<0.001
Testing Year	2112.104	3	704.035	3.509	0.015
Interaction	1482.026	3	494.009	2.462	0.061

Table 3. Frequency Distribution of Passing and Failing Candidates in Programs Initially Accredited Prior to and Since 1992 (May-August Testing Window, 2000-2003)

	Number Passing	Number Failing	Total Number
Accredited prior to 1992	19124 (96.4%)	701 (3.6%)	19825 (100%)
Accredited since 1992	1070 (94.9%)	57 (5.1%)	1127 (100%)

Chi square = 7.08, $P < 0.05$

Levene's test of equality of error variances, testing the null hypothesis that the error variances of scaled scores are equal across groups, was rejected ($F=5.421$, $P<0.001$), indicating a violation of the assumption of homogeneity of variances. Although the analysis of variance is robust despite violations to this assumption, there can be serious consequences for the validity of the final inference when very different numbers of cases appear in the various groups, as is the case here.³

As an alternative, a comparison of overall passing rates of the 2 groups was conducted using the chi square test of association. The test of the strength of association between the accreditation factor and passing or failing NAPLEX yielded a chi square value of 7.08 (critical chi square (0.05) = 3.84, $df=1$). This indicates that a relationship exists between passing or failing NAPLEX and whether students graduated from programs initially accredited prior to 1992 or since 1992 (see Table 3).

DISCUSSION

Analysis of the NAPLEX data indicated that students graduating from pharmacy programs initially accredited prior to 1992 obtained somewhat higher scaled scores on the NAPLEX than students graduating from programs initially accredited since 1992. Further study would be needed to determine the reason that graduates of programs accredited since 1992 scored lower on NAPLEX. The difference in overall NAPLEX passing rates, while statistically significant, favored programs accredited prior to 1992 as compared to those accredited since 1992 by an absolute difference of only 1.5%, or the difference of 1 to 2 out of every 100 graduates (96.4% versus 94.9%, respectively). Further analysis of data within each testing window revealed no apparent difference in passing rates for programs initially accredited since 1992 compared with graduates of programs accredited prior to 1992 for years 2000, 2001, and 2002. However, the May to August 2003 testing window did

demonstrate a significant difference in passage rates between graduates of programs initially accredited since 1992, compared to graduates of programs accredited prior to 1992. Passage rates in this testing window may have been affected by a low passing rate observed for 1 program with a large number of graduates. Analysis of passing rates and scaled scores in the forthcoming years will be necessary to observe if these trends continue. Of note, participation in NAPLEX review courses offered outside of the regular curriculum may affect NAPLEX pass rates. The impact of such participation could not be assessed as part of the above analysis and should be considered as a limitation of the study. In addition, these scores and passing rates represent graduates from both PharmD and bachelor's degree programs.

The present analysis was conducted as an initial step in addressing questions regarding the quality of instruction occurring at newer pharmacy degree programs. Performance on the NAPLEX was chosen as an indicator of the quality of instruction as it provides a standardized method with which to compare programmatic outcomes. NAPLEX measures the minimal competence needed to practice in the profession. Additional measures are needed to assess professionalism and the ability to provide pharmaceutical care. For this reason, the ACPE-AACP Joint Task Force on Assessment and Accreditation was formed in 2001 to identify standardized survey instruments that may be used to address questions of quality in pharmacy education. In 2003, the Task Force proposed standardized survey instruments for graduating pharmacy students, pharmacy faculty members, experiential education preceptors, and pharmacist alumni. The standardized instruments have been developed to enhance the assessment capabilities of a college or school of pharmacy and allow increased objective evaluation in the accreditation process. The authors hope that widespread use of these instruments will provide enhanced assessment capabilities for all ACPE-accredited pharmacy programs.

Based on the small differences in NAPLEX performance identified in this study, ACPE's accreditation review process for new colleges and schools of pharmacy appears to be addressing quality in pharmacy education appropriately. Analysis of passing rates and scaled scores in the forthcoming years will be necessary to observe if these trends continue.

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