Predictors of Associate Degree Nursing Students' Success Students

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ABSTRACT

Purpose: Entry-level nursing programs are challenged with preparing students to be successful throughout the program and on the NCLEX-RN. Lack of success impacts the student, the nursing program, and health care agencies. The purpose of this retrospective study is to assess the role of academic performance and other variables on NCLEX-RN performance.

Methods: Data were collected and analyzed from four years of classes that included 385 associate degree nursing (A.D.N.) graduates. Specific areas examined were cumulative nursing course grades, nursing entrance test scores (NET), test taking characteristics, and stress. Statistical tests used for data analysis include percentages, means, Pearson r, chi-square and t-tests.

Results: Participants who were successful on the NCLEX-RN had very similar but statistically significant higher cumulative nursing course grades in comparison to those who failed the NCLEX-RN. Because there was very little variation in cumulative nursing course grades for both groups, subtle differences in cumulative nursing course grades were significant. Variables that were not associated with student success included NET scores, type of test taker and types of stress.

Conclusions: Findings from this study suggest that even subtle differences in academic performance could be used to identify students at-risk for failing the NCLEX-RN.

Key-Words:
NCLEX-RN

Nursing student success
Nursing Entrance test (NET)
Associate Degree Nursing

Entry-level nursing programs from across the country are challenged with preparing students to be successful throughout the program and on the nursing licensure exam (NCLEX-RN). Lack of success impacts the student, the nursing program, and the health care community. Schools of nursing are feeling greater pressure to produce more graduates who will be successful on NCLEX-RN due to the nursing shortage. At the same time, the current expectations of graduates are demonstration of no less than 1,185 competencies in all areas of health care from long-term care to acute care specialty areas.[1]

Over the past ten years, a community college in central Texas experienced a decline in the NCLEX-RN pass rate and increased pressure to produce greater numbers of competent graduates to meet the needs of the area. The college is located in a town with a greater metropolitan area of 200,000, and has an enrollment of approximately 8,300. The school of nursing accepts two classes per year of 60 students. Both a day and evening program are offered. There are two major medical centers and a Veterans' Administration hospital in the area. To meet the challenge of preparing competent entry level practitioners, a study was conducted to examine the relationship between academic performance and licensure pass rates on the NCLEX-RN among associate degree of Nursing (A.D.N.) nursing students.

Review of Literature

Several variables associated with successfully completing an entry level nursing program and performance on the NCLEX-RN have been identified. In one study of 68 A.D.N. graduates, grade point average (GPA) of pre-nursing courses were predictive of success on the NCLEX-RN while the overall GPA was not predictive.[7] In another study of 186 baccalaureate graduates, higher cumulative GPA at graduation was associated with NCLEX-RN success.[8] Three other studies identified having a higher GPA in the science courses was associated with NCLEX-RN success[2-4] and two of these studies also found performance in the nursing courses predictive of NCLEX-RN success.[3-4] Higher level math and reading skills upon entering a nursing program have been linked to NCLEX-RN success.[4,7] A higher level of performance on standardized exit exams has also been linked to NCLEX-RN success.[2-4,6-8] One study used an existing instrument, the Risk Appraisal Instrument (RAI) to predict NCLEX-RN success.[9] Starting with a sample of 538 graduates over a 3 year period from a baccalaureate program, the RAI correctly classified 61% of all NCLEX-RN failures. Items scored by this instrument include nursing course grades and performance on standardized nursing exams.

There have been a collection of variables identified as impediments to progression and NCLEX-RN success. One study found that graduates not successful on the NCLEX-RN were more likely to have specific types of stress (i.e., family, academic, and money/time) prior to entering the nursing program.[7] Time management skills were identified as the biggest obstacle for not completing entry level RN programs in a study of all Texas nursing programs.[5] Having to repeat either prerequisite or nursing courses has also been associated with not being successful on NCLEX-RN.[5,7]

Sample

The sample consisted of 556 students who began the A.D.N. program between the years of 2001 through 2004. There were 385 students from the original sample who successfully completed the A.D.N. program and had NCLEX-RN results with 328 (85%) passing NCLEX-RN on the first attempt (Group 1) and 57 (15%) failing on the first NCLEX-RN attempt (Group 2).

Data Collection

Approval to conduct the study was obtained through appropriate administrative channels at the community college. Data were collected by the nursing counselor who maintains an ongoing database of various measurements of students' performance as a method of tracking performance of both individual students and the program as whole. Collected data included the Nurse Entrance Test (NET), admission ranking, nursing course grades, and cumulative nursing course grades. Prior to analyzing student data, all identifying information was coded to provide anonymity for individual students.

Results

Academic Performance in Nursing Courses and NCLEX-RN Performance

To assess differences in academic performance between students who passed the NCLEX-RN on their first attempt (Group 1) and students who failed the NCLEX-RN on their first attempt (Group 2), cumulative nursing course grades were analyzed. The cumulative nursing course grades were obtained by computing an average nursing course grade based on the five required nursing courses. For each course, students received a numerical course grade ranging from 0 to 100. When looking at the entire sample ($N = 368$), the cumulative nursing course grade for Group 1 was 79.80 (standard error of the mean {se} = .23, $n = 314$). For Group 2 ($n = 54$) the average course grade was 77.05 ($se = .36$). Although the actual difference of 2.75 points between the two means appears relatively small, this represents a six fold difference based on a standard error of the mean of .428 for the distribution of difference scores. An independent samples t-test (equal variances not assumed) revealed that there was a significant difference in average nurse course grade between the two groups

(t(101)=6.21, p=.000). This finding suggests that even small differences in average nursing course grade could be predictive of later difficulty on the NCLEX-RN if the average variation in nursing course grade is minute.

The above analysis revealed that there was a difference in variance between the two groups. This was addressed statistically by using the version of the t-test that does not assume equal variances. However, to further ensure the differences in sample size between the two groups were not skewing the results, a separate analysis was conducted on a randomized sample of 88 individuals from both groups. An independent samples t test revealed a significant difference in the means between the Group 1 subset and Group 2 ($t(86) = 3.91$, $p = .000$). The mean nursing course GPA of Group 1 was significantly higher ($m = 79.60$, $se = .56$) than the mean of Group 2 ($m = 76.88$, $se = .42$).

The above results suggest that because the variation in academic performance among nursing students may be very small, even subtle differences in nursing course grades could be critical in identifying at-risk students. However, the above analyses focused on the cumulative nursing course grades, calculated upon completion of all courses. For practical purposes, it would be necessary to identify differences in academic performance as early as possible. To address this issue, Pearson correlations were calculated to examine relationships of participants' performance in the first two nursing courses to the cumulative nursing course grades (Table I). Performance in both the first and second nursing courses was significantly correlated to the cumulative average nursing course grade. In both courses, the r-squared value was approximately .64. Therefore, higher grades in the two beginning nursing courses of the program are predictive of the final average nursing course grade

Other Variables Associated with Progression

The NET is a standardized entrance exam utilized by many nursing schools from across the nation. The exam provides information on the nursing school applicants' reading and math abilities, types of stressors, and test taker profile. Table 2 depicts the differences between Group 1 and Group 2 for reading and math NET scores. There appears to be relatively little difference across the two groups. Using a smaller randomized sample ($N = 68$) an independent samples t test confirmed that the NET scores were not significantly different across the two groups ($t(66) = .907$, $p = .368$).

Another variable examined was the type of test taker. The NET categorizes students as frustrated, instructional, or independent test takers. Frustrated test takers will have difficulty in successfully taking multiple choice and true false examinations. Instructional level test takers also have difficulty with discriminating the best option on multiple choice exams. Independent test takers are considered to be at the optimal level of skill for test taking. Table 3 depicts the percentages associated with the three different types of test takers. There appeared to be little

difference in the proportions of test-taking types between Group 1 and Group 2. A chi-square analysis confirmed that the proportion of test-taking types was not significantly different between the two groups ($\chi^2(2) = .3.296$, $p = 0.192$).

Type of stress was also examined between the two groups. The NET identifies the following stresses: family, social, money/time, academics and/or work. Table 4 depicts the percentages of individuals exhibiting the different types of stress for the two groups. For all identified stresses, there appears to be little differences in proportion of individuals exhibiting stress across the two groups. Separate Goodness of Fit Chi-square analyses confirmed that there were no significant differences associated with any of the stresses (all χ^2s > .05).

Discussion

Study results indicate that having a higher cumulative nursing course grade was associated with NCLEX-RN success. Several studies reported similar findings.[2-4,7-8] Detailed examination of the present results indicates that the difference in average nursing course grades between students who passed NCLEX-RN and students who failed NCLEX-RN appeared to be relatively minor. However, because the within group variation associated with the average nursing course grade was very small, the subtle difference in average scores produced a highly significant finding. In this study, the NCLEX-RN success group had a cumulative nursing course grade of 79.8 and the NCLEX-RN failure group had a cumulative nursing course grade of 77.05. Although the two groups only differed by 2.75 points on a 100 point scale, the cumulative nursing course grade for the NCLEX-RN failure group was six times lower than the NCLEX-RN success group in terms of standard error of the means. This finding is critical in that it indicates that even subtle differences in average nursing course grades could be used to identify students at-risk of failing the NCLEX-RN.

Importantly, the present study showed that the first two nursing courses were highly correlated with the cumulative nursing course grade. This finding suggests that relatively minor differences in performance within the first two nursing courses could be used to identify at-risk students.

The present study also examined the role of several other variables in NCLEX-RN performance. Neither reading nor math performance on the NET was useful in determining NCLEX-RN success. Next, the type of test taker as classified by the NET was not predictive of performance on the NCLEX-RN. Having the stressors of family, work, academics, money and time, and/or social were not found to have an effect on NCLEX-RN success. This finding was surprising since stress is commonly thought to be a deterrent to success. However, a licensed counselor provided group stress management sessions and individual counseling sessions for nursing students in the program included in the present study. Since the NET is administered prior to starting the nursing program, further study may

be needed to analyze if stress experienced during the nursing program affects student success.

Conclusion

Findings from this study can be used to establish a system for identifying at-risk students and preparing them for the NCLEX-RN. This study suggest that nursing programs should evaluate academic performance in the first few nursing courses and use this information to determine a metric for interpreting student performance. This study shows that differences in cumulative nursing course grade must be interpreted in relationship to the typical amount of variation around the mean. The present findings suggest that it is likely that many schools will find very little variation in course performance and that what appears to be minor differences in nursing course grades could be significant predictors in future performance on the NCLEX-RN. The study also shows that several other variables such as stress, test-taking characteristics, and reading and math performance on the NET entrance exam did not play a major role in NCLEX-RN performance.

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Table 1

Correlations (Pearson type) Between Nursing Course Grade of First Two
Courses and Cumulative Nursing Course Grade

Correlations			
I.	Beginning Course	1.00	-
II.	Second Course	.732	1.00
III.	Cumulative*	.811	.806
		I	II
*Cumulative Nursing Course Grade			

Table 2

Comparison of NET Math, Reading, and Composite Mean Scores of Group I and
Group II

Group	NET Reading	NET Math	NET Composite*
I	$m = 62.93$	$m = 76.08$	$m = 69.31$
	$se = 0.94$	$se = 0.92$	$se = 0.77$
II	$m = 61.93$	$m = 75.61$	$m = 68.10$
	$se = 2.25$	$se = 2.20$	$se = 2.04$
*NET composite is the average of the math and reading scores			

Table 3

Percentages of Type of Test Taker

Group	Frustrated	Instructional	Independent
I	8%	80.1%	11.9%
	$n = 16$	$n = 161$	$n = 24$
II	0%	89.2%	10.8%
	$n = 0$	$n = 33$	$n = 4$

Table 4

Percentages of Types of Stress and Passing NCLEX-RN on First Attempt

Group	Family		Social		Money/Time		Academic		Work	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
I	7%	93%	8%	92%	44%	56%	14%	86%	3%	97%
	n=14	n=178	n=16	n=176	n=84	n=108	n=27	n=165	n=5	n=183
II	6%	94%	11%	89%	56%	44%	17%	83%	3%	97%
	n=2	n=34	n=4	n=32	n=20	n=16	n=6	n=30	n=1	n=34