

## **Quantitative analysis of variables affecting nursing program completion at Arizona State University**

Cheryl Herrera  
Arizona State University

### **ABSTRACT**

This study is designed to understand the patterns of selection, preparation, retention and graduation of undergraduate pre-licensure clinical nursing students in the College of Nursing and Health Innovation at Arizona State University enrolled in 2007 and 2008. The resulting patterns may guide policy decision making regarding future cohorts in this program and in nursing programs at other colleges and universities.

Several independent variables were examined including grades earned in prerequisite courses; replacement course frequency; scores earned on the Nurse Entrance Test (NET); the number of prerequisite courses taken at four-year institutions; race/ethnicity; and gender. The dependent variable and definition of success is completion of the Traditional Pre-licensure Clinical Nursing Program in the prescribed four terms. Theories of retention and success in nursing programs at colleges and universities guide the research.

Correlational analysis and multiple logistic regression revealed that specific prerequisite courses—Human Nutrition, Clinical Healthcare Ethics, and Human Pathophysiology—as well as race/ethnicity, and gender are predictive of completing this program in the prescribed four terms.

Keywords: Nursing, Retention, Graduation, Regression, Attrition

## INTRODUCTION

Almost half of those who start college do not complete a baccalaureate degree (Consortium for Student Retention Data Exchange Retention Report, 2009). This attrition rate is also true of students in Bachelor of Science in Nursing (BSN) programs (American Association of Colleges of Nursing, 2011). Given the shortage of nurses in the United States and the cost to educate nurses, this attrition rate is especially concerning.

Baccalaureate nursing programs must be able to accurately and efficiently identify students most likely to succeed in these programs, graduate with a BSN and pass the National Council Licensure Examination-Registered Nurse (NCLEX-RN). Research indicates that there is a need for a parsimonious explanation of BSN readiness and attrition to guide policy makers in nursing programs in institutions of higher education to decrease the attrition rate and boost the BSN graduation rate (Byrd, Garza, & Nieswiadomy, 1999, p. 1; Newton and Moore, 2009, p. 273).

Nursing programs across the country use a variety of factors to determine which students will be the best prepared to pursue nursing studies, complete the BSN, and pass the NCLEX-RN. Among these factors are scholastic aptitude measures such as grade point average (GPA) and nursing aptitude measures (Byrd, et al., 1999, p. 37) such as standardized aptitude tests (Newton, Smith & Moore, 2007).

As the largest producer of baccalaureate prepared nurses in the state of Arizona, the College of Nursing and Health Innovation at Arizona State University (ASU) graduates approximately 180 BSNs each year through the pre-licensure baccalaureate clinical nursing program (<http://nursingandhealth.asu.edu/>).

This research will focus on the quantitative factors used to determine which students will be given the coveted clinical nursing spaces in the traditional BSN at ASU. The independent variables examined include the grades earned in prerequisite courses; replacement course frequency; scores earned on the Nurse Entrance Test (NET); the number of prerequisite courses taken at four-year colleges versus two-year colleges; race/ethnicity; and gender. The dependent variable is dichotomous and is: completion of the upper division nursing program in the prescribed four terms, thus earning the BSN, or interruption in progress toward the BSN such as failing a nursing course or discontinuation of the degree program.

## LITERATURE REVIEW

Much of the research on attrition in nursing programs concludes that for students to be successful in a baccalaureate nursing program colleges must admit academically strong candidates. Students who are admitted with strong scholastic and nursing aptitudes are less likely than students admitted with weak aptitudes to have progression/retention issues (Brown and Marshall, 2008; Newton et al.; 2007; Symes, Tart and Travis, 2005). Scholastic aptitudes are usually characterized as high school GPAs or the GPA earned in nursing prerequisites. Nursing aptitudes are usually measured using standardized tests such as the ACT, SAT or a nursing pre-entry test like the Nurses Entrance Test (NET) or the Test of Essential Academic Skills (TEAS).

Newton & Moore (2009) found that pre-nursing grades of less than 2.5 are associated with having a weak scholastic aptitude (Newton & Moore, 2009). Specific pre-nursing courses

cited as being the most predictive of success include science courses (Potolsky, Cohen, & Saylor (2003) and human pathophysiology (Uyehara, et al., 2007).

Standardized nursing aptitude tests are widely suggested for use with other admission data (Crow, et al., 2004; Newton, Smith Moore, et al., 2007). Tests such as pre-college scores on the SAT or ACT, or nursing aptitude tests such as the Nurse Entrance Test (NET) or the Test of Essential Academic Skills (TEAS) are expected to be important predictors of success in nursing programs. A study by Newton, Smith, Moore, et al. (2007) reported that the TEAS was able to predict first semester nursing program success and that the TEAS was a more reliable predictor of first semester success than was pre-nursing GPA. Wolkowitz, and Kelley (2010) found when studying TEAS as a predictor that the science section of the TEAS was "...a statistically significant predictor and the strongest of the four content areas in the prediction of early nursing program success" (498).

Other variables found to affect retention in nursing programs include whether students start the nursing education at a four-year or two-year school. Newton suggests that BSN students who initiate their post-secondary educations at community colleges are potentially at higher risk for attrition than students who initiate their post-secondary educations at a four-year college or university (2006).

## **NURSING AT ARIZONA STATE UNIVERSITY**

The faculty of the College of Nursing and Health Innovation at Arizona State University have identified 15 prerequisite courses that are required for the Traditional Pre-licensure Clinical Nursing Program (TPCNP). They are Human Anatomy and Physiology 1 and 2, Chemistry, Microbiology, English Composition 1 and 2, Human Development, College Mathematics, Human Nutrition, Psychology, Statistics, Clinical Health Care Ethics, Introduction to Nursing and Healthcare Systems, Culture and Health, and Human Pathophysiology. For students to be considered for the TPCNP they must earn a grade of "C" (2.00) or higher in each of these courses. The combined grade point average (GPA) for all courses must be at least a 3.25 for students to be considered for the TPCNP.

If students earn grades of "C" or "B" in prerequisite courses they may be allowed to take *replacement courses*. Replacement courses are identified by the faculty as courses at a level higher than the original prerequisite. Some students opt to take replacement courses to maximize the prerequisite GPA. So, for example, a student who earned a "C" in ENG 101 might opt to take a higher level composition course, then earn an "A" or a "B" and use that new grade in the GPA computation. The nursing faculty believe that students who take replacement courses are less likely to be successful than those who earn high grades initially in the prerequisite courses (Morris, 2012).

The faculty of the College of Nursing and Health Innovation at Arizona State University also require that students earn at least minimum scores on an entrance test. Until 2010, the Nurses Entrance Test (NET) was the prescribed entrance test. A reading score of 60% or higher and a math score of 65% or higher was required to be considered for the TPCNP. The belief is that those with higher NET scores will be more likely to complete the program in the prescribed four terms.

Many ASU nursing students begin their studies at ASU and, thus, take the pre-nursing courses there. Other students take the pre-nursing courses at community colleges or other two-year colleges and then attempt to transfer to ASU. The nursing faculty and this author believe

that students who have taken all or most of their courses at four-year colleges will be more successful than those students who took all or most of them at two-year colleges (Morris, 2012; Herrera, 2012).

## DATA AND VARIABLES

Academic aptitude was used in this study by examining the grades earned in pre-nursing courses which were the prerequisite courses for the nursing program at ASU. Nursing aptitude was used in this study by examining the scores earned on the NET. The effect of taking pre-nursing courses at four-year institutions versus two-year institutions was also included in this study by determining how many of the prerequisite courses were taken at each type of institution. Race/ethnicity and gender were used in this study to determine if there were any disparities based on these demographics. Race/ethnicity was identified in this study using the categories used by ASU and in the following way: Asian, Black, Hispanic, Native American, or White. Gender was identified as male or female.

So the following represent the independent variables used in this study: Grades earned in prerequisite courses, Number of Replacement courses taken, Number of Prerequisites taken at four-year schools, Nurses Entrance Test scores in Reading and Math, Race/Ethnicity, and Gender. The dependent variable was dichotomous and is: the completion of the upper division nursing program in the prescribed four terms, thus earning the BSN, or interruption in progress toward the BSN such as failing a nursing course or discontinuation of the degree program.

The data for this research were obtained from records maintained by the College of Nursing and Health Innovation in the Student Data Management System (SDMS) on students who were advanced to the Traditional Pre-licensure Clinical Nursing Program (TPCNP) in spring 2007, fall 2007, spring 2008, and fall 2008. The entire population of 584 students advanced to the upper division nursing program were included in the study. This time period was selected so that enough students would be included in the population to yield a large enough sample size of students who do not progress without interruption for the prescribed four terms to meet confidence levels and significance criteria of multiple logistic regression analysis. This time period was also chosen because all students admitted/advanced during this period would have taken the NET.

## METHODOLOGY AND FINDINGS

The first step taken in analyzing the data collected for this research was to run correlational analysis. Pearson's  $r$  coefficients of 0.4 to 1.0 were examined in this study and represent moderate to high levels of correlation and significance levels of .05 or lower were reported as significant in this study. The significant correlations are found in Table 1 (Appendix).

The variables with the highest Pearson's  $r$  were NET Reading and NET Composite scores,  $r = .806$ ,  $p < .001$ , and NET Math and NET Composite scores,  $r = .690$ ,  $p < .001$ . These findings are not surprising given that the NET Composite score is made up of the NET Reading and NET Math scores. We expect a high level of correlation between the two parts of the composite score and the composite score itself. The Pearson's  $r$  coefficients indicate that either the NET Reading and NET Math should be used in the regression analysis, or the NET

Composite score, but not both. Therefore, the NET composite will not be used in further analysis.

Because the Select GPA is comprised of Composition 1, Composition 2, and three lab science courses from Anatomy and Physiology 1 and 2, Chemistry, and Microbiology, a high correlation between these variables and the Select GPA is expected. In fact there were no moderate to high correlations between the Composition courses and the Select GPA nor Chemistry and the Select GPA. The data indicate, though, that Anatomy and Physiology 1, Anatomy and Physiology 2 and Microbiology were moderately correlated with select GPA as follows: Anatomy and Physiology 2,  $r = .594$  at  $p < .001$ , Microbiology with a Pearson's  $r = .584$ ,  $p < .001$ , and Anatomy and Physiology 1 with a Pearson's  $r = .510$ ,  $p < .001$ . This indicates that the grades earned in these three courses are correlated with the Select GPA. Again, this finding is not surprising given that three lab science courses must be included in the Select GPA. Because some of the course grades are moderately correlated with the Select GPA, either the individual course grades should be used in regression analysis or only the Select GPA but not both. Therefore, the Select GPA will not be used in subsequent analysis. All other variables had Pearson's  $r$  correlation coefficients of less than 0.4 and were, therefore, not highly correlated. Some correlations were statistically significant and others were not.

The next step in analyzing the data was to run frequencies and descriptive statistics for each variable. The results are found in Table 2 (Appendix). The variable Number of Replacement Courses has a range of 0 to 6 with a mean of .36 and a standard deviation of .737. This indicates that most students did not take replacement courses or, if they did take them, they usually took only one replacement course. More than 68%, or 400 of 584, did not take any replacement course. Approximately 17%, or 100 of 584, students took one replacement courses. About 8%, or fewer than 50 students, took two replacement courses and very few took three replacement courses. Results can be seen in Figure 1 (Appendix).

NET math scores are negatively skewed. The lowest score earned was a 68% and the highest was 100%. Many more students earned scores in the 90s than below that. The mean is 92.14 and the standard deviation is 5.735. NET reading scores are normally distributed and the grades ranged from 60% to 94%. The mean is 75.62 and the standard deviation is 7.025. Results can be seen in Figures 2 and 3 (Appendix).

There are 42 Asian students, or 7.5%; 14 Black students, or 2.5%; 61 Hispanic students, or 10.9%; 10 Native American students, or 1.8%; and, 432 White students, or 77.3%. This translates to 22.7% non-White students in the study. The results for race are Table 3 (Appendix).

Nationwide, nurses are predominantly female. Of the 2.1 million registered nursing in the United States only 5.4% are male. Men also make up only 13% of all new nursing students (Chung, 2012). This pattern is observed in these data where a vast majority, 88.2%, of the students in the study are female; the remaining 11.8% are male. The results are in Table 4 (Appendix).

Five hundred forty eight of 584 students, or 93.8%, in the study completed the program in four terms. The remaining 36 students, or 6.2%, did not complete the program in four terms. Based on anecdotal evidence gathered by the researcher some students returned to complete the degree in five or more terms which raises the success rate over five or more terms. Very few did not complete the program at all.

The National League for Nursing Accrediting Commission (NLNAC, 2008) recognizes programs with an 80% or higher completion rate as successful programs. Therefore, Arizona State University's program is successful with a 93.6% completion rate. Of note is that the

completion rates of each race/ethnicity do not differ significantly from each other at the .05 level. However, the completion rates for Black and Hispanic students are lower than expected, albeit not significantly, and raises some concern.

All ten of the Native American students completed the program in the prescribed time period. They are followed by the White students with a 94.7% completion rate; Asian students with a 92.9% completion rate; Hispanic students with an 88.5% completion rate; and Black students with a 78.6% completion rate.

Native American students have the lowest scores on the math portion of the NET and, yet, had the highest completion rate at 100%. Black students have the highest mean NET math score and, yet, have the lowest completion rate at 78.6%.

Native American students have the lowest mean NET reading score but, again, have a 100% completion rate. Hispanic students have the second highest mean NET math score after White students, yet the second lowest completion rate at 88.5%.

The variable Number of Courses Taken at Four-Year Schools indicates how many of the 15 courses in this study were taken at four-year colleges as opposed to two-year colleges. The range is 0 to 15 with a mean of 9.21 and a standard deviation of 4.702. This means that 57.7% of all courses taken were taken at four-year schools rather than at two-year schools and 95% of students took between four and ten courses at four-year schools. Results can be seen in Figure 4 (Appendix).

Minimums, maximums, means and standard deviations are not reported for Race/Ethnicity, Gender, and Completed the Program in Four Terms. Race/ethnicity and Gender are nominal level variables and Completed the Program in Four Terms is dichotomous therefore, the descriptive statistics are not meaningful.

The next step in the analysis was to complete logistic regression analysis. The results are found in Table 5 (Appendix). The model has an  $R^2$  value of 0.43. The first six variables in the table above are statistically significant at the .05 level or below. These variables include the courses Human Nutrition, Clinical Healthcare Ethics, and Human Pathophysiology; male students; Black students, and Hispanic students.

The sign for the coefficients reported in column two of the table (B) is negative for male students, Black students, and Hispanic students. This indicates that students from those categories are less likely to complete the program in the prescribed four terms compared to female students, in the case of males, and all other races with respect to Black and Hispanic students. The odds ratio (*OR*), for male students is 0.223 which means that as movement goes from female students to male students the odds of being in the category completed in four terms for male students is reduced by a rate of 0.223. In other words, males students are .223 times less likely to complete the program in four terms.

The odds ratio for Black students is 0.098. This means that if Black students are compared to all other races of students, Black students are 0.098 times less likely to complete the program in four terms. The odds ratio for Hispanic students is 0.304. This means that if Hispanic students are compared to all other races of students, Hispanic students are 0.304 times less likely to complete the program in four terms.

For Human Nutrition, Clinical Healthcare Ethics, and Human Pathophysiology the *B* values in column two are positive. This indicates that as the grades earned in the courses moves up one level, from a "C" to a "B" or a "B" to an "A", that the likelihood of being in the category completed in four terms increases. The odds ratio for Human Nutrition is 2.801. So, as the

student grades moves up one level, the students are 2.801 times more likely to complete the program in four terms.

The odds ratio for Clinical Healthcare Ethics is 3.818. That means that as the student grades move up one level they are 3.818 times more likely to complete the program in four terms. The odds ratio for Human Pathophysiology is 2.112. That means that as the student grades move up one level they are 2.112 times more likely to complete the program in four terms. The other variables in the logistic regression analysis were not statistically significant at the .05 level or below

## **SUMMARY**

The United States is projected to have a nursing shortage which could intensify as the population ages and the need for health care grows. Nursing colleges and universities across the country are struggling to expand enrollment levels to meet the rising demand for nursing care.

Because of the need to graduate increasing numbers of baccalaureate prepared nurses in cost-intensive programs, baccalaureate nursing programs must be able to accurately and efficiently identify students most likely to succeed in these programs, graduate with a BSN and pass the National Council Licensure Examination-Registered Nurse (NCLEX-RN).

Research indicates that there is a need for a parsimonious explanation of BSN readiness and attrition to guide policy makers in nursing programs in institutions of higher education to decrease the attrition rate and boost the BSN graduation rate (Byrd, et al., 1999, p. 33). Thus, the important questions asked in this research are: what is the pattern of selection, preparation, retention, and graduation of nursing students in the College of Nursing and Health Innovation at Arizona State University? What factors help to predict which students will be most likely to complete the BSN in preparation for the NCLEX-RN and subsequent practice as a Registered Nurse? What policy changes could be made to assist those students who complete the program at lower rates? Are the findings from ASU generalizable to other nursing programs?

However, not all variables included in this research were predictive of success in the program. This research allows readers to see which of the factors better predict success than others and to contemplate policy changes, if needed. In addition, the research disclosed uneven completion rates for some categories of race/ethnicity and gender within the small subset of students that did not complete the nursing program in four terms.

The course Clinical Healthcare Ethics was statistically significantly related to outcome but the other pre-nursing courses with high mean GPAs were not. One explanation is that the content in Culture and Health and Introduction to Nursing and Healthcare Systems is less closely tied to the academic requirements of the upper division nursing curriculum than Clinical Healthcare Ethics. Clinical Healthcare Ethics has a humanities focus and covers the Nurses Code of Ethics including such topics as respect for human dignity, the nurses' relationship to patients, privacy, confidentiality, moral self-respect and responsibility for the healthcare environment (nursingworld.org). Culture and Health has a broader social and behavioral science orientation and focus on intercultural communication and healthcare. Introduction to Nursing and Healthcare Systems is an introductory level course which covers the social, political and economic context in which the nursing profession and healthcare systems evolved. The curriculum in Clinical Healthcare Ethics, including the Nurses Code of Ethics, is integrated into the clinical nursing courses and students are graded in those courses, in part, based on their understanding of that code and use in the clinical setting.

Human Pathophysiology had the lowest mean GPA, is a rigorous course, and was also statistically significantly related to completion of the program in four terms. It is the study of the human body in disease. Since that is the primary focus of most of the upper division nursing curriculum it is not surprising that it is also more closely related to success in the program.

Finding the limited number of course grades that are correlated with completion of the program supports some of the research cited earlier (Newton et al., 2006, 2007, 2009; Brown and Marshall, 2008; California Postsecondary Education Commission, 2003; Symes, et al., 2005; DeBartola and Seldomridge, 2005). However, the broad spectrum of courses included in the study, including composition, math, statistics, science courses and others, was not supported. Potolsky, et.al., (2003) found that science course grades were predictive of success in nursing programs and this study did not support that finding. Uyehara (2007) found grades in Human Pathophysiology to be predictive of success and that finding was supported by this research.

Replacement course frequency had no statistically significant effect on completion of the program. This may be due to the fact that students were able to take a course at a higher level than the original prerequisite course and, therefore, were able to gain additional mastery in that discipline. It may also be that the content of the course taken most closely to the time of beginning the upper division nursing coursework had a more immediate effect on success in the program. Most students did not take replacement courses and, the few who did, took only one, two or three replacement courses.

Whether the prerequisite courses were taken at two-year or four-year colleges had no statistically significant effect on completion of the program. This finding contradicts the findings of Newton regarding the lower success rates for transfer students from two- to four-year colleges. However, in the current study, most of the students (more than half) took more than half of the prerequisite courses at four-year colleges.

The NET math and reading scores did not have a statistically significant effect on completion of the program. Interestingly, American Indian students had the lowest scores on the sections of this exam yet completed the program at the highest rate.

Although the numbers are small, Black and Hispanic students completed the program at statistically significantly lower rates than the other categories of students. However, the Native American students had the highest completion rate at 100%.

The College of Nursing and Health Innovation at Arizona State University has a special program for Native American students called American Indian Students United for Nursing (ASUN). The purpose of ASUN is to increase the number of American Indians/Alaskan Natives studying nursing at Arizona State University and the number of nurses providing care to American Indians/Alaskan Natives. ASUN is not a separate nursing program but rather provides scholarship support to American Indian/Alaskan Native students studying nursing at Arizona State University (<http://nursingandhealth.asu.edu/asun/>). This program provides tutoring, computer laboratories, reading rooms, and mentorship to Native American students. This nurturing program appears to have a positive effect on the ability of Native American students to complete the program. If the goal is to raise completion rates for Black and Hispanic students, similar programs to nurture those students are likely to have positive outcomes.

Male students completed the program at statistically significantly lower rates than female students. It is not clear why that is the case since only quantitative data were used in the study and no interviews were conducted with individual students. A possible reason for this outcome is that men only represent about 10% of the student population in this program. There is not a critical mass of male students nor are there support programs for them.



Further research at ASU and at other colleges and universities is recommended in the following areas: 1) research to determine if the TEAS is predictive of success in the program since the NET was not predictive; 2) research to determine if the relative weights of the course grades and the TEAS scores affects the selection of students to participate in the program and if those weights negatively affect certain categories of race/ethnicity; 3) continuous tracking of American Indian students to determine if the ASUN program continues to contribute to their success in the program; 4) research to determine which of these, or other, factors contribute to passage of the NCLEX-RN; 5) research to determine why some students take longer than the prescribed four terms to complete the program; and, 6) research that includes qualitative factors such as student commitment outside of their education.

## CONCLUSION

This research has provided some insight into the patterns of selection, preparation, retention and graduation for students in the Traditional Pre-licensure Clinical Nursing Program in the College of Nursing and Health Innovation at Arizona State University. Quantitative data analyses revealed that specific prerequisite courses, certain categories of race/ethnicity, and gender are predictive of completing this program in the prescribed four terms. Recommendations were made for further research and for policy considerations to further improve this program.

## REFERENCES

- American Association of Colleges of Nursing (2011). *Fact sheet: Nursing Shortage*. Retrieved from <http://www.aacn.nche.edu/media/factsheets/nursingshortage.htm>.
- Brown, J., Marshall, B. (2008). A historically Black university's baccalaureate enrollment and success tactics for registered nurses. *Journal of Professional Nursing*, pp. 21-29.
- Byrd, G., Garza, C., & Nieswiadomy, R. (1999). Predictors of successful completion of a baccalaureate nursing program. *Nurse Educator*, 24(6), 33-37.
- California Postsecondary Education Commission, (2003). <http://www.cpec.calgov/completereports/2003reports/03-09.pdf>.
- Consortium for Student Retention Data Exchange (CSRDE) Retention Report (2009). *The retention and graduation rates of entering baccalaureate degree-seeking freshman cohorts from fall 2000 through fall 2007 in 424 colleges and universities*. Center for Institutional Data Exchange and Analysis (C-IDEA). The University of Oklahoma.
- Crow, C., Handley, M., Morrison, R. & Shelton, M. (2004). Requirements and interventions used by BSN programs to promote and predict NCLEX-RN success: A national study. *Journal of Professional Nursing*, pp. 174-186.
- DiBartolo, M., & Seldomridge, L. (2005). A review of intervention studies to promote NCLEX-RN success of baccalaureate students. *Nurse Educator*, 166-171.

- National League for Nursing Accrediting Commission (NLNAC).  
[http://www.nlnac.org/manuals/SC2008\\_BACCALAUREATE.htm](http://www.nlnac.org/manuals/SC2008_BACCALAUREATE.htm).
- Newton, S. E., & Moore, G. (2009). Use of aptitude to understand bachelor of science in nursing student attrition and readiness for the National Council Licensure Examination-Registered Nurse. *Journal of Professional Nursing, 25*(5), 273-278.
- Newton, S. E., Smith, L. H., & Moore, G. (2007). Baccalaureate nursing program admission policies: Promoting success or facilitating failure? *Journal of Nursing Education, 46*, 439-444.
- Newton, S. E., Smith, L. H., Moore, G., & Magnan, M. (2006). Predicting early academic achievement in a baccalaureate nursing program. *Journal of professional nursing, 23*(3), 144-149.
- Potolsky, A., Cohen, J., & Saylor, C. (2003). Academic performance of nursing students: Do prerequisite grades and tutoring make a difference? *Nursing Education Perspectives, 24*(6), 246-250.
- Symes, L., Tart, K., & Travis, L. (2005). An evaluation of the nursing success program: Reading comprehension, graduation rates, and diversity. *Nurse Educator, 21*(7), 217-220.
- Uyehara, J., Magnussen, L., Itano, J., & Zhang, S. (2007). Facilitating program and NCLEX-RN success in a generic BSN program. *Nursing Forum, 42*, 31-38.
- Wolkowitz, A. A., & Kelley, J. A. (2010). Academic predictors of success in a nursing program. *Journal of Nursing Education, 49*, 498-503.

Appendix

Table 1: Correlations Showing Significant Variables Only

	<u>Anatomy/Phys</u>		<u>Select GPA</u>		<u>NET</u>	
	<u>r</u>	<u>Count</u>	<u>r</u>	<u>Count</u>	<u>r</u>	<u>Count</u>
Anatomy/Phys 1	0.419	582	0.499	584		
Anatomy/Phys 2			0.578	582		
Human Patho			0.462	583		
Microbiology			0.573	583		
Human Nutrition			0.432	584		
NET Math					0.69	584
NET Reading					0.806	584

Note. All correlations are statistically significant,  $p < .001$



Table 2: Grades Earned in Fifteen Prerequisite Courses Required for Admission to the Nursing Program

		A (4.0)	B (3.0)	C (2.0)	Total	Mean Std Dev
Culture and Health	Count	554	29	1	584	3.95
	Percent	94.86%	4.97%	0.17%	100.00%	0.23
Clinical Health Care Ethics	Count	507	75	2	584	3.86
	Percent	86.82%	12.84%	0.34%	100.00%	0.35
Human Development	Count	493	82	8	583	3.83
	Percent	84.56%	14.07%	1.37%	100.00%	0.41
Intro Nursing/ Health Systems	Count	492	82	10	584	3.83
	Percent	84.25%	14.04%	1.71%	100.00%	0.42
Composition 2	Count	456	85	12	553	3.80
	Percent	82.46%	15.37%	2.17%	100.00%	0.45
Human Nutrition	Count	426	138	20	584	3.70
	Percent	72.95%	23.63%	3.42%	100.00%	0.53
Composition 1	Count	408	131	20	559	3.69
	Percent	72.99%	23.43%	3.58%	100.00%	0.53
Statistics	Count	425	127	25	577	3.69
	Percent	73.66%	22.01%	4.33%	100.00%	0.55
Psychology	Count	405	135	37	577	3.64
	Percent	70.19%	23.40%	6.41%	100.00%	0.60
Mathematics	Count	405	131	40	576	3.63
	Percent	70.31%	22.74%	6.94%	100.00%	0.61
Microbiology	Count	322	229	32	583	3.50
	Percent	55.23%	39.28%	5.49%	100.00%	0.60
Chemistry	Count	330	203	45	578	3.49
	Percent	57.09%	35.12%	7.79%	100.00%	0.64
Anatomy and Physiology 1	Count	335	206	43	584	3.50
	Percent	57.36%	35.27%	7.36%	100.00%	0.63
Anatomy and Physiology 2	Count	296	202	84	582	3.36
	Percent	50.86%	34.71%	14.43%	100.00%	0.72
Human Pathophysiology	Count	<u>244[1]</u>	237	102	583	3.24
	Percent	41.85%	40.65%	17.50%	100.00%	0.73

[1] Two grades of 3.50 were rounded to 4.00 in this table.

Table 3: Race/Ethnicity and Completion of the Program in the Prescribed Four Terms Crosstabulation

			Ethnicity/Race					Total
			1 Asian	2 Black	3 Hispanic	4 Native American	5 White	
1 Did complete program in 4 terms	Count		39 <sub>a</sub>	11 <sub>a</sub>	54 <sub>a</sub>	10 <sub>a</sub>	409 <sub>a</sub>	523
	Expected Count		39.3	13.1	57.1	9.4	404.2	523
	% within Ethnicity/Race		92.90%	78.60%	88.50%	100.00%	94.70%	93.60%
Total	Count		42	14	61	10	432	559
	Expected Count		42	14	61	10	432	559
	% within Ethnicity/Race		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Each subscript letter denotes a subset of Ethnicity/Race categories whose column proportions do not differ significantly from each other at the .05 level.

Table 4: Frequencies for Gender

		Frequency	Percent	Valid Percent
Valid	Male	69	11.8	11.8
	Female	515	87.7	88.2
	Total	584	99.5	100.0
Missing	System	3	.5	
Total		587	100.0	

Table 5: Logistic Regression Analysis Results

	<i>B</i>	<i>S.E.</i>	Wald	Sig.	Odds Ratio ( <i>OR</i> )	95% C.I. for EXP( <i>B</i> )( <i>OR</i> )	
						Lower	Upper
Human Nutrition	1.03	0.381	7.325	0.007**	2.801	1.329	5.907
Gender(1) Male	-1.502	0.575	6.826	0.009**	0.223	0.072	0.687
Ethnicity(2) Black	-2.323	0.967	5.768	0.016*	0.098	0.015	0.652
Clin Health Ethics	1.34	0.563	5.667	0.017*	3.818	1.267	11.506
Pathophysiology	0.748	0.349	4.585	0.032*	2.112	1.065	4.188
Ethnicity(3) Hispanic	-1.192	0.602	3.923	0.048*	0.304	0.093	0.988
Psychology	0.62	0.335	3.42	0.064	1.859	0.964	3.588
CoursesatFourYear	0.103	0.056	3.403	0.065	1.109	0.994	1.237
Anat/Phys 1	-0.822	0.471	3.052	0.081	0.439	0.175	1.105
Human Dev	0.89	0.515	2.988	0.084	2.435	0.888	6.677
Microbiology	0.594	0.405	2.15	0.143	1.811	0.819	4.003
Composition 1	0.545	0.437	1.557	0.212	1.725	0.732	4.063
Replace Course	0.545	0.458	1.413	0.235	1.724	0.702	4.235
NETMath	0.047	0.043	1.206	0.272	1.048	0.964	1.139
Statistics	-0.448	0.432	1.073	0.300	0.639	0.274	1.491
Intro Nursing	-0.587	0.576	1.038	0.308	0.556	0.180	1.720
Culture/Health	-1.394	1.636	0.726	0.394	0.248	0.010	6.121
Anat/Phys 2	-0.263	0.361	0.529	0.467	0.769	0.379	1.561
Ethnicity(1) Asian	-0.312	0.878	0.126	0.723	0.732	0.131	4.097
Chemistry	0.114	0.384	0.088	0.767	1.121	0.528	2.378
NETRead	0.005	0.036	0.019	0.891	1.005	0.936	1.079
Math	0.05	0.381	0.017	0.895	1.051	0.498	2.218
Composition 2	0.048	0.446	0.011	0.915	1.049	0.437	2.516
Ethnicity(4) Native	19.767	12035.74	0	0.999	3.84E8	0	.
Constant	-10.236	8.757	1.366	0.242	0		

Note: All tests have 1 df. \*\* significant at <.01. \* significant at <.05

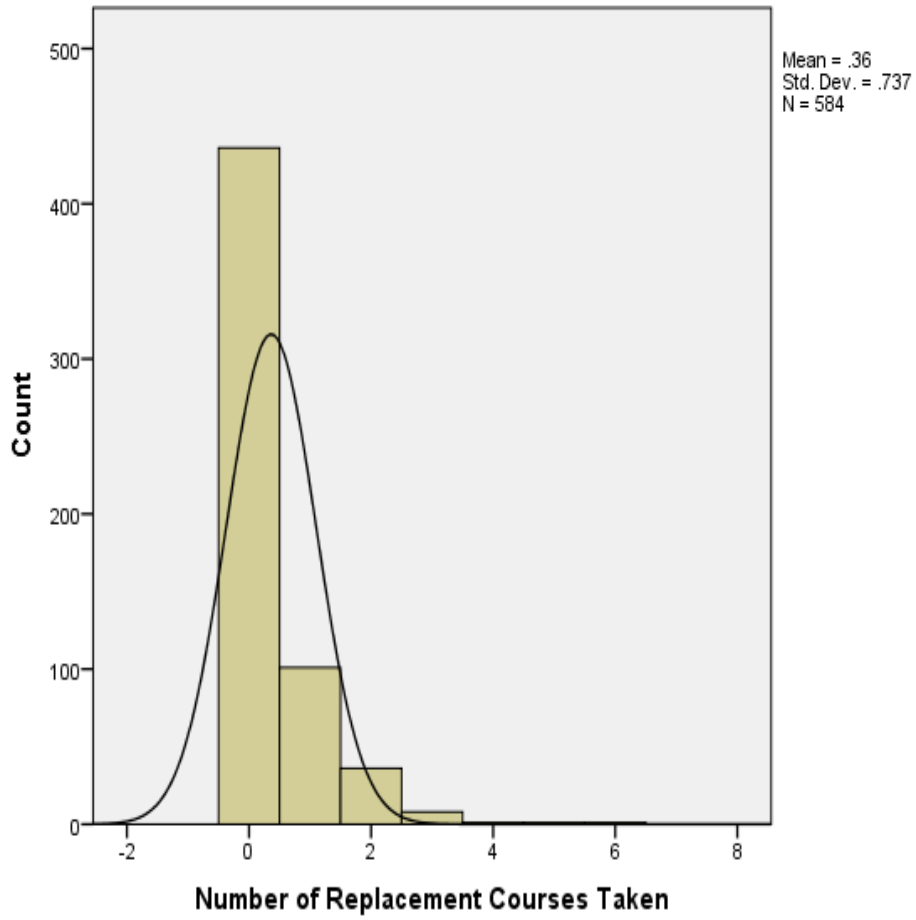


Figure 1: *Number of Replacement Courses Taken, or Courses Taken at a Higher Level than the Originally Required Course.*

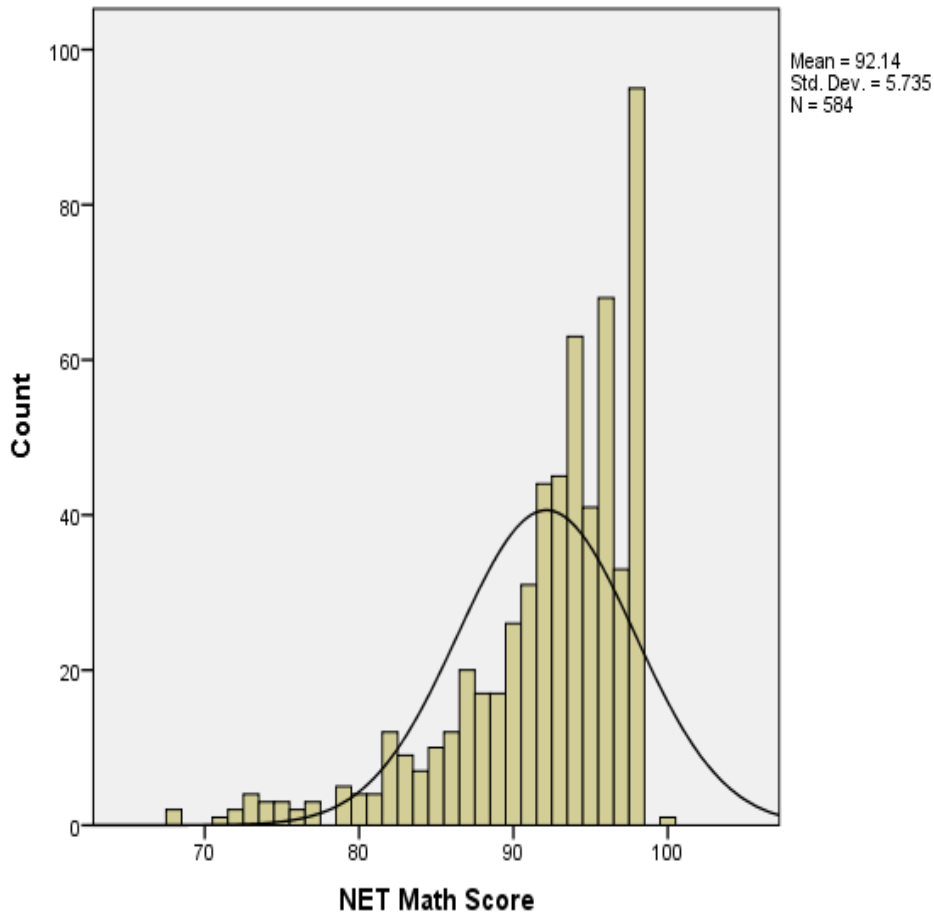


Figure 2: *Nurses Entrance Test (NET) Math Scores Earned by Students in the Study*



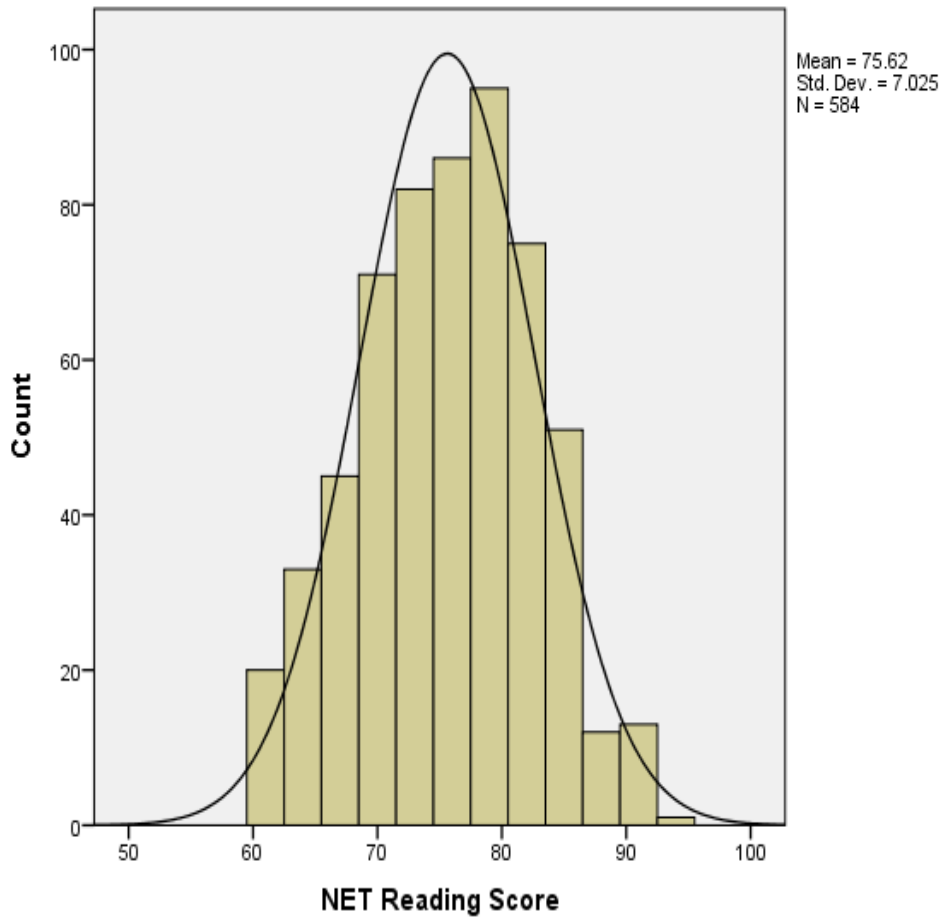


Figure 3: *Nurses Entrance Test (NET) Reading Scores Earned by Students in the Study*

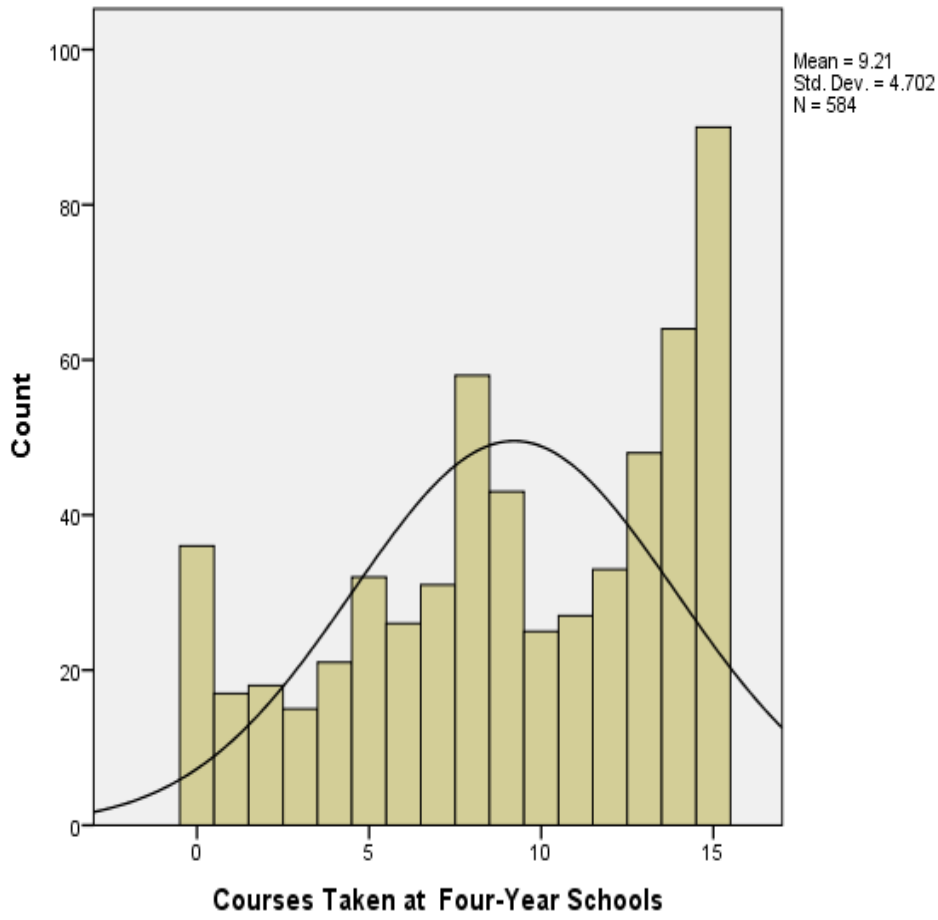


Figure 4: *Prerequisite Courses Taken at Four-Year Colleges vs. Two-Year Colleges*