THE EFFECT OF STRUCTURED INTERVIEWS ON PREDICTING THE SUCCESS OF ASSOCIATE DEGREE NURSING STUDENTS

by

Linn M. Storey

(Under the Direction of Libby Morris)

Abstract

Screening processes for nursing program admission are necessary to best utilize the limited faculty and facility resources and ensure that the maximum number of students will proceed to graduation and licensure. The nursing shortage has been highly publicized, attracting more applicants to nursing programs. However, the shortage affects the number of qualified faculty members as well, and many existing experienced faculty members are nearing retirement age. Selecting the criteria for program admission is important but remains controversial; objective versus subjective requirements raises many concerns. This study examines the value of individual student interview scores when used alone and when used in combination with objective criteria to predict the success of associate degree nursing students. The correlation of COMPASS scores, prerequisite course grade point averages, National League of Nursing Pre-nursing Exam percentile scores and interview scores are evaluated by their correlation to the nursing course grade point average at the time of program completion. Multiple linear regression analysis and logistic regression analysis are used on a sample of 209 students accepted into an associate degree nursing program over a 5 year period at a technical college in Georgia. The impact of gender and the probability of program completion regardless of nursing course

grade point average are also examined. The results indicate a composite model that includes NLN Pre-nursing Exam scores and prerequisite course grades to be the best predictors of success based on the nursing course grade point average. The probability of program completion without regard to nursing grade point averages indicates the reverse of the main study; interview scores and COMPASS scores seem to be significant indicators of program completion. Gender shows no significant correlation to nursing grade point average or to program completion.

INDEX WORDS: Nursing program admission, Selective admission for nursing programs, Interviewing nursing program applicants, Predicting nursing student outcomes

THE EFFECT OF STRUCTURED INTERVIEWS ON PREDICTING THE SUCCESS OF ASSOCIATE DEGREE NURSING STUDENTS

by

LINN M. STOREY

B.S.N., Columbus State University, 1995

M.P.A., Columbus State University, 1997

A Dissertation Submitted to the Graduate Faculty of The University Of Georgia in Partial Fulfillment of the Requirements for the Degree

DOCTOR OF EDUCATION

ATHENS, GEORGIA

2008

THE EFFECT OF STRUCTURED INTERVIEWS ON PREDICTING THE SUCCESS OF ASSOCIATE DEGREE NURSING STUDENTS

by

Linn M. Storey

Major Professor:	Libby Morris
Committee:	Brad Courtney Denise Gardner Doug Toma

Electronic Version Approved:

Maureen Grasso
Dean of the Graduate School
The University of Georgia
December 2008

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

CHAPTER 1

INTRODUCTION

Background of the Problem

The nation is experiencing a critical shortage of healthcare providers, a shortage that is expected to increase in the next five years, just as the largest population in our nation's history reaches the age when increased medical care is necessary. Staffing of hospitals, clinics, and nursing homes is more critical than ever as the large numbers of "baby-boomers" begin to realize the need for more frequent medical intervention and long term care. Interest in becoming a nurse has waned in recent years, probably due to the history of the intense and demanding educational process, low salary, inflexible and long hours, and rapid "burn-out" of those practicing in the profession. A complex managed care environment in this nation is limiting the dollars available to be spent on nursing care. Many health professions, especially nursing, have the reputation of "eating their young" rather than offering effective mentoring to grow future healthcare providers. As a result of these factors, the number of nurses has decreased and employers find themselves understaffed and competing for competent personnel. Prior to 2001 the decline had been evident for several years (Rosseter, 2001). The population of nurses in America is aging also, including the faculty responsible for the education of future nurses, hence colleges and universities are experiencing difficulties in finding competent, credentialed faculty (Johnston, 2000).

As the nursing shortage is published in the news media and talked about among the general population, an increasing number of individuals are seeking to enter the field as

recent high school graduates or as adults returning to school for a second career. Enrollment in nursing programs increased steadily from 2001 – 2006 according to the American Association of Colleges of Nursing (AACN). However, admission into most schools remains limited due to the faculty-student ratios required by state boards and national governing organizations, and due to the many unfilled faculty positions across the nation. Data collected in 2006 by AACN shows that more that 32,000 program applicants who were academically qualified may have been turned away from nursing programs. In addition, many students who are accepted into nursing programs do not complete the program due to personal problems or failing grades (Rosseter, 2001). Because of the increasing health care needs, the shortage of professionals, and the economic climate, the burden falls on nursing programs to maintain a careful balance between accepted students and successful graduates. Nursing programs are now challenged by admissions decisions that will yield the highest retention and graduation rates. Pass rates on the national licensure exam, NCLEX, are also important in determining the success of students best suited for the nursing profession.

Screening and selective admissions processes for nursing programs are necessary to select the most qualified, most likely to succeed students in order to make the best use of the limited faculty members and admission slots. Graduates must be caring, competent, and capable of providing quality health care; and, they must be educationally prepared to pass national competency certification and licensure exams. Careful attention must be paid to the selection of the criteria that will be used in screening applicants. Although many approaches and combinations of criteria have been used in the past, it is more crucial than ever to screen applicants with tools that best predict the graduation of students, as well as their success on certification and licensure exams.

The admission process into a nursing program is usually multi-staged and includes the evaluation of cognitive abilities and personal qualities (Salvatori, 2001). Reliable and valid measures of assessment that are predictive of success must be identified and utilized alone or in combination with each other in order to ensure that an optimum number of applicants with the highest probability of successful program completion are accepted for admission. Common tools used to select nursing program students include high school grade point averages, college grade point averages, standardized college admission test scores, scores on a specialized preadmission nursing test, and individual interviews. Cognitive measures as admission tools are easily linked to academic success, but high attrition rates remain an issue.

Standardized testing scores, primarily the SAT, have been and remain the base determinant of admission into health related programs of study. Hundreds of validity studies have been conducted over many years, the majority of which show that high school grades and SAT scores together are significant predictors of academic success in college (Camara & Echternacht, 2000). Even though the SAT scores show general learned abilities and are a decent predictor of college success (Adelman, 1999), score differences related to gender, ethnicity, race, and economic status have been demonstrated (Zwick, 1999). It has also been noted that persistence and success in college are influenced by nonacademic factors for which standardized testing is not a good predictor (Camara & Echternacht, 2000).

Baccalaureate and associate degree nursing programs have pre-nursing standardized tests, designed and published by the National League for Nursing (NLN) and other validated instruments, available for use as an admission selection tool. In a study conducted by Campbell and Dickson (1996), the pre-nursing exam was predictive of success on the National Council Licensure Exam for Registered Nurses (NCLEX-RN) 100% of the time. This licensure exam,

developed and administered by the National Council of State Boards of Nursing, Inc. (NCSBN), tests the entry-level competence of a nursing program graduate prior to professional practice. Although this result should be used with caution since it was only one study, other studies have shown these exams to be good predictors of nursing graduate success on the NCLEX-RN (Gallagher, Bomba, & Crane, 2001).

High school grade point averages can be evaluated and used for admission screening, and some studies have shown them to be the best predictor of academic success in college (Salvatori, 2001). However, more non-traditional students than ever are returning to college many years after their high school graduation. These students bring years of real-world experience and developed work ethics which are not reflected in their high school grades but which could affect their college and health care profession success.

Deficiencies in academic preparation often cause problems for nursing students when they enter nursing courses, resulting in major changes and/or failures. Defining academic success in college grade point averages and determining which prerequisite courses have the ability to predict success are important in a selective admission process (Lewis & Lewis 2000). Science and nursing course grades have been demonstrated as strong cognitive predictors of successful program completion (Campbell & Dickson, 1996), but students have already been accepted into a program at that point. Lewis and Lewis (2000) found successful students typically had taken two or more anatomy and physiology courses prior to nursing program admission. A study of California Community College Associate Degree Nursing Programs (Phillips, Spurling, & Armstrong 2002) described a prediction model that contains overall college grade point average, English grade point average and Core Biology grade point average as main factors in predicting success.

Individual student interviews can be used as a component of selective admission processes for nursing programs to assess non-cognitive factors. Personal characteristics essential to success in the nursing profession, such as compassion, emotional maturity, empathy and self-awareness might be assessed in a personal interview (Rosenberg, Perraud, & Willis 2007). Interviewing prospective students can be done in unstructured, semi-structured, or structured formats, but a major concern in all formats is the bias and subjectivity brought to the interview by the interviewers (Edwards, 1990). Another concern is the amount of time required of faculty and staff to conduct interviews on all qualified applicants. Hall, Regan-Smith, and Tivnan (1992) found interview scores of medical students to have a positive correlation to student ratings after four years of medical school. The same study found interviews to be a better predictor of future grades than either the Medical College Admission Test (MCAT) or science course GPA's. Interviews are conducted for admission into many nursing programs, but a very limited amount of research has been conducted on their value. One study, conducted at the University of Tel-Aviv, Israel (Ehrenfeld & Tobak 2000) found interviews to be partially effective as a screening tool, and noted that the attrition rate increased without interviews.

Although research on the ability of standardized testing, high school grades, and prerequisite course grades to predict success in nursing programs is abundant, there have been very few studies done to determine the ability of individual interviews to predict student outcomes. There is a gap in the literature related to the effect on the ability to predict success in nursing programs when the results of individual interviews are used alone or in addition to standardized testing and prerequisite course grades.

Problem Statement

Due to the increased need for nurses and the limited faculty resources available in this and most programs, it is necessary to determine the essential criteria to be used in the selective admission process for nursing programs in order to ensure the admission of those students who are most likely to succeed in the programs, on the licensure exams, and in the professional arenas of health care. Screening processes for nursing program admission are necessary to best utilize the limited faculty and facility resources and ensure that the maximum number of students will proceed to graduation. Graduates must be competent and capable of providing quality health care, and they must be educationally prepared to pass state licensure exams.

Selecting the components of the competitive process is important but remains controversial; objectivity versus subjectivity raises many concerns. Although standardized testing has been challenged in relation to multicultural effects on scores, it remains a primary method to determine admission eligibility. Grades, usually high school transcripts or grades in prerequisite science courses, are also evaluated and used as criteria for admission.

Individual student interviews by a panel of selected faculty, professionals, and administrators are frequently used as screening tools during competitive admission processes in nursing to give faculty members the opportunity to meet perspective students and ask selected questions. But, interviews can be very time consuming, and the results are based on the subjective opinions of the interviewers. The nature of the interview, the participants, the scoring process, and the level of subjectivity involved must be carefully considered. There is abundant research showing the predictable value of standardized tests and grade point averages, but there have been very few studies conducted that are concerned with the ability of individual interviews

to predict outcomes. This study will address the gap in the literature related to the effects of adding structured interviews to cognitive-based admissions processes.

Purpose of Study

The purpose of this study is to determine the extent to which individual interviews, when paired with college admission standardized test scores, specialized pre-nursing standardized test scores and prerequisite course grades, add to the predicted success of nursing students based on the grade point average of nursing courses at the time of graduation. The associate degree nursing program at a small technical college in Georgia ranks four criteria on each qualified applicant to determine acceptance into the program: COMPASS scores, National League of Nursing (NLN) Pre-nursing Exam percentile score, prerequisite course grades and an individual interview score. COMPASS is a standardized, computer-based test produced by the American College Testing Program (ACT) that evaluates skill levels in Reading, Writing, Pre-Algebra and Algebra for college course placement. All students applying for admission to the college must take this exam. The NLN Pre-nursing Exam is a standardized exam that is written by nursing educators and professionals and used as an entrance evaluation in many nursing programs nation-wide.

The only subjective criterion, the interview, is costly and time consuming. It is unknown if the interview scores add to the prediction of successful program completion or if the objective criteria are better indicators singularly or as a group. Successful completion of the program, for the purpose of this study, is the grade point average of the required nursing courses in the program. There are 11 separate courses that include theory, lab and clinical hours for a total of 55 quarter credit hours. A grade of C or better must be attained in each course for a student to continue in the program sequence.

Analyzing admission data from the records of students accepted into the program over a five year span could justify the expense and time that is devoted to the interview process or determine that the objective variables alone are better predictors. Understanding current and past practices and results can guide future decisions related to changing practices or allowing them to remain the same (Merriam & Edwin 2000).

Questions

The research questions guiding this study are:

1) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with college admission standardized test scores (COMPASS)?

2) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with specialized pre-nursing standardized exam scores (NLN Pre-nursing Exam)?

3) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with prerequisite course grades?

4) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with college admission standardized test scores, specialized pre-nursing standardized test scores, and prerequisite course grades?

5) How does the gender of applicants relate to program completion of students in an associate degree nursing program?

6) Does an interview score predict the program completion of an applicant?

Significance of the Study

The theoretical significance of this study will be the evaluation of subjective input data as an additional assessment to objective data in the determination of outcomes. Objective input data, such as standardized test scores and course grades, are generally considered to be the best input predictors (Astin, 1993). Specific to nursing programs, Lewis and Lewis (2000) found that prerequisite course grades are good predictors of the final college grade point average. However, the admission process for nursing programs usually includes both cognitive abilities and personal qualities (Salvatori, 2001). The personal qualities of applicants are evaluated in the interview process, so the results of this study could add to the small body of literature that is available related to the value of subjective input in the selection process of nursing students.

Interviews of program applicants require many faculty and staff hours to plan, schedule and execute. This results in additional expense and time away from other responsibilities. The practical application of this study will be to identify the additional benefit, if any, of individual interviews on predicting the success of nursing students. The results could eliminate the additional cost and time created by the use of interviews, or the results could justify the need for such interviews in the admission process of nursing programs. Either outcome could impact the ability of nursing programs to select students who are most likely to successfully complete the program, become licensed and join the profession as a registered nurse. This, in turn, would be an avenue to addressing the current and future nursing shortage.

Limitations of the Study

There will be several limitations expected in this study and other limitations may become apparent as the study progresses. The study will investigate a nursing program in a small technical college in Georgia which has interviewed applicants over a five year time frame. The

program manager for the program who selects the interview panels changed twice during the five years, therefore the composition of the interview panels varied in size and composition. Some panels were composed solely of health science faculty, others contained faculty and administrative personnel, while other panels had additional professional members from the healthcare service community. There were never fewer than three members on any panel, but in some instances the panels numbered five and six.

The interview tool was developed locally by program managers in the school of health sciences at the same technical college with minimum research conducted on the content of the tool. The maximum point score is 25 for each interview. Inter-rater reliability has never been evaluated; the scores of each interviewer are simply averaged for the final student score. However, the same tool was used for each interview over the five years, with slight modifications to the scenario type questions; these questions were revised each year to deter students from anticipating and planning for specific questions. The interview tool was identical in many ways for all interviews; all sought to determine applicant goals, their reasons for choosing a health care career, their ability to formulate ideas and communicate them to others, and their ability to think critically when given a situation or problem. After each interview panel, members evaluated the applicant's appearance, body language, communication skills, and grammar as well as their response to the questions to arrive at their score. The size and location of the sample may be another limitation of the study. Although the sample includes more than 200 program accepted applicants over a period of five years, all are from the same technical college population in a southern state. Generalizing the results should be done with that in mind. A final limitation of the study is the lack of graduates who were selected without an interview score, because all students selected since the beginning of the program have an interview score.

There is not a sample group of students available who were selected based only on objective criteria to determine outcome differences between that group and the sample group used for the study.

Theoretical Model

This study is grounded in the role of pre-assessments in predicting student outcomes. Several authors, including Astin (1993), have written about student input data that can be used to determine outcomes. Cognitive function, such as standardized testing and previous grades, can be assessed as input measures, but there may be other criteria that play important roles in outcomes. Demographic characteristics, personal goals, attitudes, behavioral patterns, religious beliefs and financial concerns may be variables that improve or lower the success of students. Some of these inputs could possibly be evaluated during an interview but are more difficult to measure. Astin's conceptual model that includes environment of the educational experience as an input variable does not pertain to this study, but using an interview to identify personal goals, reasons for choosing nursing as a career, attitudes about caring for others, etc. could provide valuable information about prospective students.

It is the hypothesis of this researcher that subjective as well as objective assessment of qualified applicants may be necessary to more accurately determine successful completion of associate degree nursing programs; that the relationships among the variables when combined better predict the outcome of the student. The study consists of three objective assessments (COMPASS scores, Pre-Nursing NLN percentile score, prerequisite course grades) and one subjective assessment (interview) as independent variables, and one outcome measure (nursing course GPA) as the dependent variable.

CHAPTER 2

LITERATURE REVIEW

Introduction

This chapter will review the literature that is considered significant in the area of selective admission processes and their value to associate degree nursing programs. Nursing programs in the United States are under pressure to accept and graduate more students every year due to the current shortage of nurses in the workforce and the looming increase in that shortage over the next few years. The United States Department of Labor estimates a 23% increase in new positions in 2016 over 2006, the largest number of new positions among all occupations. In addition to these new positions, needed primarily to care for retiring baby boomers, the majority of the current registered nurse workforce will begin to retire in 2010, and new graduates leave the profession at a rate of 13% a year. As a result, there could be as many as 800,000 unfilled positions by 2020 (Buerhaus, Staiger & Auerbach, 2003).

It will become more and more important to select the students who are most likely to complete the coursework and pass the NCLEX-RN exam to become licensed. Because of the increasing health care needs and the economic climate, nursing programs must maintain a careful balance between accepted students and graduates. What criteria or combined sets of criteria are important to evaluate when considering student selection: selective course grade point average; standardized admission test scores; specialized pre-admission tests for pre-nursing students; individual interviews; or a combination of all of these?

Research related to grade point averages and standardized test scores used by nursing programs is abundant and often combined within the same study; but little has been written about

the individual interview process as a selection criteria. This review of literature organizes the variables into the following sections:

1) General variables used in selective admission processes

2) Standardized tests scores used in the selective admission process

3) Prerequisite grades and overall grade point averages used in the selective admission process

4) Structured individual interviews used in the selective admission process

General Variables Used in the Selective Admission Process

Many colleges and universities use standardized tests and high school grade point averages in their admission process. However, review of literature shows various additional methods are used by allied health and nursing programs to select candidates who are most likely to be successful in the programs and in the professions. Grade point average of college courses prior to program admission has been shown to be the best predictor of academic success in health programs, but the relationship to clinical performance has not been shown (Salvatori, 2001). Standardized tests that are specific to the field of study are good predictors of success on licensure and certification exams , especially in the nursing (Wall, Miller, & Widerquist 1993), but many allied health professions do not have valid standardized tests required for entry into the work force. More research is needed to determine methods that best assess non-cognitive applicant characteristics.

The admission process in nursing programs is usually multi-staged and includes cognitive abilities and personal qualities (Salvatori, 2001). Reliable and valid measures of assessment that are predictive of success must be identified to better utilize limited program space, faculty ratios and clinical availability. Science and nursing course grade point averages have been demonstrated as strong cognitive predictors for the NCLEX-RN (Campbell & Dickson, 1996),

but students have already been accepted into a nursing program when they are taking these courses. Campbell and Dickson (1996) analyzed 47 nursing research studies conducted from 1981 – 1990 that were done to predict student success. Questions posed for the meta-analysis included, in brief: 1) What are the demographics of successful students? 2) How effective are predictors in determining retention, graduation, and NCLEX-RN success? 3) How effective are interventions? They determined from the meta-analysis that large numbers of nontraditional students are entering nursing programs, and that there is increased diversity. They also identified patterns and trends based on the review. Quantitative variables most often studied in the time frame were grade point averages and standardized tests. All grade point averages were found to correlate significantly with graduation and NCLEX-RN success, which was congruent with studies as early as 1978. SAT scores were found to be the standardized test most often studied as a predictor variable, even though the ACT was determined to be the best predictor of NCLEX-RN success. The authors stated, "The NLN pre-nursing examination was predictive of success 100% of the time. However, because it was used in only one study, this finding should be used with caution". (Campbell & Dickson, 1996, p. 57). One especially interesting point made in the meta-analysis was related to the determination that there is a consistent prediction of student success related to science course grades: interventions aimed at increasing success should begin at the pre-nursing level with special attention to tutoring at-risk students while they are enrolled in basic science courses. The overall findings of Campbell and Dickson (1996) included the inability to consistently identify predictive characteristics of nursing students. The major recommendation for further study was related to more collaborative study between colleges of comparable size, curriculum, degree level offered and student population with increased funding for nursing education research in general.

McLaughlin, Moutray, and Muldoon (2007) studied the role of nursing students' personality and self-efficacy in relation to drop out rates and academic performance. This was a longitudinal study of 384 nursing students from a university in Belfast, Ireland, using questionnaire that measured their confidence level on a 5-point scale. Their study found that students with higher self-efficacy scored higher grades while students who were more impulsive, extraverted and apathetic scored lower marks. The authors defined extraverted students as those who are assertive and social but who seek constant stimulation and frequently become bored. One of the conclusions derived from this study was that personality evaluation could contribute, along with other evaluative tools, to selecting the students for nursing programs who are most likely to complete the program.

A study completed by Zeidner, Kremer-Hayton, and Laskov (1990) examined scholastic aptitude, grades, and interviews as predictors of success in nursing school in Israel, and even though it depicts results from another country where nursing programs might differ from local programs, the findings could be important. High school achievement was found to be a weak predictor of program completion, and standardized test scores were found to be the best indicator of performance and program completion. Interviews were found to be a valid predictor of good clinical performance but a poor predictor of passing grades on exams.

Rosemary Liegler (1997) conducted a study to predict the overall satisfaction of senior students in baccalaureate nursing programs. The results showed some relation between satisfaction and academic progression. Integration into the social system as well as the academic system accounted for 42% of the variance for predicting satisfaction, ergo success. Yellen and Geoffrion (2001) studied 190 associate degree nursing students from 1996 through 1999 to

determine success predictors. They demonstrated that entrance reading scores showed a significant difference in relation to pass and fail rates in the program.

Lamm and McDaniel (2000) conducted a study to identify which variables best predict the success of practical nursing students on the licensure exam. They conducted a retrospective study at a public, community-based college in Indiana on a sample of 667 practical nursing students over a five year period. Demographic, academic, and aptitude data were coded and a logistic regression analysis was used to determine the relationship between the variables and NCLEX-PN success. Findings identified no relationship between age, gender, socioeconomic status, or GED versus high school graduate. Race had a significant bivariate relationship when analyzed alone, but was not a significant predictor when analyzed with other variables. They found college GPA to be the most accurate predictor of NCLEX-PN success. Aptitude was measured with several scales, but the General Mental Ability subscale proved to have the strongest predictive value. Overall the predictors of practical nursing student success on NCLEX-PN were found to be similar to the research conducted on predictors of nursing student success on the NCLEX-RN.

A significant study by Jeffreys (1998) was reported in the January/February issue of *Nurse Educator*. She conducted a study to predict the retention and academic success of non-traditional nursing students, which she defined as a part time student, one who commutes, or one who is older than twenty-four years, based on a model by Bean and Metzner (1985). Using background variables, particularly high school performance, academic variables at the college level, and environmental variables that influence the student outside of the academic environment, Jeffreys did a linear regression analysis. The outcome of the environmental variables was particularly interesting. Family responsibilities and family crisis were found to

restrict academic achievement. However, family support was found to be related to academic success. Identifying at-risk, non-traditional students prior to admission could increase retention and success rates. Jeffreys advocates student self-appraisals during the transition phase from pre-nursing to program admission in order to plan guidance and advisement.

In 1981 Hultquist completed a dissertation at the University of Southern California on admission variables as predictors of success in three classes of an associate degree nursing program with a total of 240 students. There were three purposes of her study, one of which was to determine if there is an equation that can be used to select applicants who are most likely to succeed in the program. Using a step-wise analysis of multivariates she discovered four variables that best predict the selection of successful students: chemistry grade; Microbiology grade; Davis Reading Speed Test Score; and previous work experience in the health field. She concluded that objective data can predict successful students, but that utilizing more than one variable in the selection process results in a more precise selection. A primary recommendation made in the study is that nursing programs validate the use of their selection criteria.

A more recent dissertation (Roberts, 2002) studied the effects of ranked and non-ranked selection criteria in relation to success of associate degree nursing students in California. The researcher had witnessed changes in admission processes from ranked to non-ranked in order to meet the mission of community colleges, but there was very little data concerning the outcome of the changes. Student success rates were dropping at a high cost to the institution, the community, and the students. The study spanned five years of admission at 71 California community colleges. Data were collected using locator cards and a survey instrument and an analysis with both descriptive statistics and z-scores was done. Findings showed a significant

difference in success when a selective admission ranking was utilized as opposed to non-ranked admission, advocating changes in selective criteria needed to increase success.

Professions other than allied health and nursing are concerned with the predictive value of admission criteria, also. Villeme (1983) studied factors that might predict performance on teacher certification exams in Florida. A sample of 400 southern Florida university students was used in the step-wise regression study. Grade point average and standardized test scores were examined as well as race, sex, and other demographics, and it was determined that standardized test scores were the best predictors of success on the certification exam. Salzman (1991) presented a study that examined ACT (American College Testing), PPST (Pre-Professional Skills Test), and GPA (grade point average) as predictors of success on the Teacher Performance Assessment Instruments using a sample of 620 students as subjects. The data from the study suggest verbal skills, especially reading, to be important predictors of academic success. A study by Smittle (1995) utilized high school grade point averages and rank, standardized placement tests, and student characteristics to examine the usefulness of comprehensive assessment to predict community college grade point averages. The results suggest that both academic and non-academic variables are predictive of success when used as part of a comprehensive model. In 1988 a retrospective study of physical therapy students supported the value and use of qualitative input, such as interviews, but did not support traditional quantitative input, such as test scores and grades, as predictors of success in the program (Gramet & Terragina, 1988).

Research that investigates general variables for student selection in nursing and other professional programs varies in outcomes but seems to point to the need for the use of combined evaluative criteria rather than a single, deciding factor. Personality and attitude may be

important in addition to grades and standardized scores. A closer look at literature pertaining to each of these is detailed in the following sections.

Standardized Test Scores Used in the Selective Admission Process

Hundreds of validity studies have been conducted over many years, the majority of which show that high school grades and SAT scores together are significant predictors of academic success in college. It has also been noted that persistence and success in college are influenced by nonacademic factors for which standardized testing is not a good predictor (Camara & Echternacht, 2000) .

Even though the SAT has been proven to show general learned abilities (Adelman, 1999), score differences related to gender, ethnicity, race, and economic status have been demonstrated (Zwick, 1999). The ACT and the SAT have been investigated by academic journals as well as by the popular press over the years, and an array of reasons have been given for the reported bias contained within the tests. Socioeconomic and cultural factors along with genetic and language factors have been noted in test bias (Zwick). The University of California decided upon a simple solution to the 1996 California Proposition 209 which prevented race or ethnicity from being used as admission criteria in the state. They used evidence showing that the SAT eliminated minorities from admission and decided to eliminate the SAT totally as admission criterion (Zwick, 1999). Adelman, in an article published in *The Chronicle of Higher Education* (1999), states that academic quality and intensity shown in a four year high school curriculum is a much stronger predictor of college success than "a three hour test on Saturday morning" (p. B4).

The tests do not create the differences, they just show the differences, according to Eleanor Home, Executive Assistant to the president of the Educational Testing Service (ETS) (Rodriguez, 1996). The Educational Testing Service began sensitivity reviews in 1970 to

eliminate stereotypes and offensive terms, and in 1980 they began to review for fairness of the tests for certain groups (Rodriguez, 1996). In 1999 the United States Department of Education's Office for Civil Rights published a draft guide to college and university admissions offices notifying them that relying on standardized testing alone could result in charges of illegal discrimination (Clegg & Ostrowsky, 1999).

However, there is justification in using SAT scores to determine college admission, because the test is a decent predictor of success for first year college students (Adelman, 1999). In an article published in *The Chronicle of Higher Education* the authors (Clegg & Ostrowsky, 1999) stress that we need to distinguish between qualified and unqualified applicants for their own benefit as well as that of the institution. Standardized testing itself is a controversial area but other research points out positive indicators. A study by Paszczyk (1994) examined ACT scores to determine if they are reliable in predicting academic success in college. The study looked at graduates of Chicago State University between 1990 and 1993 who had taken the ACT at the time of admission, for a total sample of 428 students. Results of the study indicated a correlation between ACT scores and the final GPA of the student; as the ACT increased, so did the final GPA.

Other types of standardized testing, those specific to pre-professional specialty areas, can serve as admission criteria in addition to the ACT and SAT. Although the PPST (Pre-Professional Skills Test) was shown to have questionable additional predictive value for college of education admissions (Mikitovics & Crehan, 2002), the National League of Nursing pre-nursing tests have been found to predict program success as well as success on the NCLEX-RN (Wall, et al. 1993). A study completed in 2001 (Gallagher, et al. 2001) found that the Entrance Exam for Schools for Nursing (RNEE) is a good predictor of success in the first nursing course,

and the average in the first nursing course is predictive of successful completion of the program. The reading comprehension subtest score on the RNEE proved to be of special importance in estimating a minimum score that would in turn determine a 50% probability of success in the nursing program.

Researchers often study evidence of predictive validity of standardized tests, the degree to which they can predict future performance in the education process. Mikitovics and Crehan (2002) conducted such a study on the Pre-Professional Skills Test (PPST) as a part of admission requirements for colleges of education. The study looked at PPST and ACT scores of 372 graduates and found the PPST to be a weak predictor of success in future performance and may only be an expensive duplication of what is shown by the cheaper ACT. The results suggested that the tests measure similar constructs.

Some research studies focus on specific part of admission exams. A retrospective study done by Yellen and Geoffrion (2001) found entrance reading exam scores to be significantly different between passing and non-passing groups of nursing students. The authors state that noting this prior to, or at the time of, admission allows for early remediation which is important in light of the recent enrollment decline in nursing programs. It provides an opportunity to revise recruitment and admission standards by first, better predicting the success of students, and second, by identifying those students at risk and designing development strategies for them.

Another retrospective study was designed and conducted in 1993 for the purpose of identifying academic variables that predict success on the NCLEX-RN (Wall et al. 1993). Variables studied included the SAT and National League for Nursing Diagnostic Readiness Test. Subjects were part of a baccalaureate nursing program from a private, liberal arts college in the Midwest. Out of a total of 92 students only 86 had SAT scores and 55 had scores for the

Diagnostic Readiness Test. The study used inferential statistics to determine which variables predicted success. The results indicated that data obtained prior to program acceptance can predict performance on the NCLEX-RN, but that the high school rank was more significant than the SAT score. Since other studies had indicated that the SAT, especially the verbal portion, is a good predictor of success on the NCLEX-RN, the authors recommended that this be explored further. The Diagnostic Readiness Test proved to a good predictor of success on the NCLEX-RN, but other tests have been developed and evaluated as well.

The Nurse Entrance Test (NET) was developed by Educational Resources, Inc. (ERI) as a diagnostic tool for nursing program admission. Scores are given in basic areas of math, reading comprehension, reading rate, learning styles and test taking skills, but critical thinking skills are also evaluated. Non-academic indicators are also included in the NET, such as areas related to individual stress level and ability for social interaction. A study in 2003, conducted by Sayles, Shelton and Powell indicated that the NET be used to predict success in nursing programs, especially by identifying at-risk students. For instance, students who speak English as a second language and scored less that 55% on the reading comprehension portion had a greater likelihood of failure. Identifying such groups of students prior to admission can result in specialized tutoring and involvement of the students in programs aimed at increasing student success.

Critical thinking, described by many nursing researchers as essential to the nursing process and profession, is evaluated by NET in three different sections: inferential reading, main idea of passage and predicting outcomes. The concept of critical thinking can be difficult to define. Hynes and Bennett (2004) define it as "making informed and purposeful decisions by looking beyond the obvious" (p. 26). Ellis, in a 2006 study, describes it as "purposeful, goal-directed thinking" that combines "experience, knowledge and intuitiveness" (p. 263) to make

decisions when caring for patients. Her study, which looks at the NET as a predictor of success in program's admission process in Louisiana, found that the critical thinking portion is one way to predict program completion and NCLEX-RN success.

Although standardized admission tests and pre-nursing admission tests have been researched for many years by the agencies publishing the tests and by individual researchers, questions about the results and how to use them still arise. These tests can and probably should be an integral part of a selective process.

Prerequisite Grades and Overall Grade Point Averages Used in the Selective Admission Process

Deficiencies in academic preparation often cause problems for nursing students when they enter nursing courses, resulting in major changes and/or failures. Defining academic success as it related to program completion in grade point averages and determining which prerequisite courses have predictive value are important in selective admission processes (Lewis & Lewis, 2000). Many researchers have studied cognitive and non-cognitive variables on college GPA, but there are few studies that look at prerequisite grades of nursing students in relation to their success on the NCLEX-RN. Overall, Lewis and Lewis (2000) found, when reviewing literature, that nursing prerequisite grades and standardized testing scores predict final college GPA. Their study constructed a correlation matrix to examine the relationship between student's academic records in college and their academic success. They looked at 168 students after completion of two years of coursework necessary for transfer into the last two years of a nursing program. Success after four years was defined as a cumulative GPA of 2.5 or higher. Predictors of a this success were found to be twofold, though both were mild predictors: 1) successful students typically had taken two or more anatomy and physiology prior to nursing

admission, and 2) students taking prerequisite courses at a four year school were more successful.

A study reported in *Nurse Educator* (Ostrye, 2001) focused on successful completion of practical nursing programs, stating that most research on prediction of success is focused on baccalaureate nursing programs. A review and meta-analysis of 47 nursing education studies reported as a part of this research effort showed that grade point averages in science courses was one of two greatest predictors of academic success. Since the author could find no research since the NCLEX-PN was revised in 1996, she sought to determine success predictors for practical nursing students. Demographic characteristics, pre-admission testing scores, and basic skill courses taken were the variable analyzed. The study found two pre-nursing admission variables to be correlated with NCLEX-PN success: 1) Psychological Services Bureau-Aptitude for Practical Nursing Exam (SB-APNE), Natural Science subscale test score, and 2) remedial reading courses. The strongest predictor of all investigated variables in this study was found to be the cumulative nursing course grades, but courses prior to entering the nursing program have been researched as predictors, too.

A study in 2003 by Potolsky, Cohen and Saylor determined that performance in basic science courses, especially biology can be a reliable predictor of nursing program success. Another finding when analyzing the prerequisite course grades and nursing grades was that students exhibited higher grades in the prerequisite courses, especially sciences, than in initial nursing courses. The researchers discussed the difference in the evaluation processes of these two very different types of courses, explaining that science course grades were based on retention of knowledge and facts while nursing course grades are based on the application of complex concepts to hypothetical situations involving critical thinking and problem solving

about patient care. Therefore, the ability of science course grades to predict nursing course grades might be limited.

Significant predictors of student success, identified in a study conducted by Phillips, et al. (2002), were anatomy, physiology and microbiology grades. Their study, done in the California Community College System to develop a model that would improve completion rates, also indicated that overall GPA and English GPA were predictors of student success in nursing programs. Eighty five percent of the students completed the program successfully when reading scores were used a selective criteria. Only 75% of students completed the program when reading scores were not used as a selection criterium.

Although high school grades may not be the best indicator of program completion as described in the first section of this review of literature, certain prerequisite course grades at the college level can be very important. Science, including biology and chemistry, can have a heavy impact when predicting the ability to complete a nursing program, but English grades can also be shown as predictors.

Structured Individual Interviews Used in the Selective Admission Process

Interviewing prospective students can be done in unstructured, semi-structured, or structured formats, but a major concern in all formats is bias of the interviewers and standardization of the interview tool (Edwards, 1990). The time and cost involved in conducting individual interviews concern many nursing program faculty members, especially when it is unclear if they add any value to the selective process. Very few studies have been conducted that relate directly to nursing programs, but several have been completed in allied health program, medical schools and other specialized areas of study. A study completed by Hall, et al. (1992) found that interview scores of medical school applicants correlated positively

with ratings after four years and were better predictors of program completion than the Medical College Admission Test (MCAT) scores or science GPA's. Interviews were conducted individually by a panel of two interviewers selected randomly from an interview pool. The interview scores contained academic as well as nonacademic criteria, because the interviewers considered the academic history of the candidate when calculating the score. Student success was determined as being on the dean's letter rating at the time of graduation. The study found a significant relationship between interview scores and the dean's letter rating, and the authors recommended the interview as a valid predictor of success.

Another Medical School study revealed moderate-to-low correlations between other admission criteria and interviews in a study reported by Patrick, Altmaier, Kuperman, and Ugolini (2001), but it was shown that the interview provided useful information. Participants included 490 applicants to a medical school residency program who underwent an interview process as part of selective admission. The interviews were structured and the inter-rater agreement was good. Higher scores on the interview predicted a greater chance of being accepted into the program.

A study of Physical Therapy students in which only one qualitative independent variable was used was done in New York (Gramet & Terragina, 1988); that variable was a rated, personal interview. Several quantitative variables were employed in various regression statistical models. A sample of 98 Physical Therapy program applicants from 1972 – 1980 was used to conduct a retrospective study to determine which pre-professional variables are predictive of successful program completion. The best predictor of program completion was a four variable model of which the personal interview score was included along with high school grade average,

prerequisite course grades, and age at the time of entry. In the discussion of the study, the authors (Gramet & Terragina) state,

> Although the three variable model had merit, it was felt that the increased predictive power achieved by the addition of the personal interview, warranted the recommendation of the use of the four variable model. The five, six, and seven variable models did not significantly increase the prediction of the dependent variable. (p. 371)

Identifying the personal interview as an important independent variable in this study confirmed the value of the interview in a selective admission process, and the continuation of the interviews was reinforced for the program regardless of cost and time involved.

Another allied health program study was conducted in 1994 on radiology technology students at East Tennessee State University to evaluate the admission criteria and process that was being utilized (Shehane, 1994). Program completion was defined as success. Students accepted into the program (70) were ranked based on their academic record and an interview. A majority of the students were successful (83%) in the program, and these successful students showed that the academic ranking was statistically significant in predicting their program completion, but the interview ranking did not show as a significant predictor of student success.

Studies have been done in other non-medical professional areas, as well. Zinatelli and Dube (1997) describe a structured interview method to be added to the selection process of students into a chemical engineering program in Canada. Their goal was to develop an equitable strategy for selective admission processes that would lower the chance of turning away prospective students who are likely to be successful.

Although the reliability of personal interviews for admissions purposes in the field of nursing is controversial, they have been shown to provide an excellent rating tool when used

correctly. Yet other studies have found that interviews contribute no more than what is already available from standardized tests and academic records, and many of them show that personal relationships could bias the process. In a study done at Tel-Aviv University (Ehrenfeld & Tobak, 2000) it was found that interviews can be somewhat successful in screening drop-outs, but the attrition rate increased when interviews were not part of the admission process. Data was gathered from admission candidates and staff through the completion of questionnaires relating to the interview process and from academic records. All who participated in the study indicated that they had reservations about interviews being used as selective criteria for the nursing program, mainly because they considered it to be subjective and of little predictive value. The researchers found the majority of dropouts to be the result of personal reasons, followed by low academic ratings. Findings, as described above, indicate that attrition is reduced when interviews are involved in the admission process. However, they found that improvement was needed in the format of the interviews, moving from unstructured to a more structured format.

One of the variables considered in a study done in 1985 to identify predictors of academic success of associate degree nursing students was nursing faculty input through a personal interview (Oliver, 1985). Applicants were questioned, during the interview, about their perceptions of nursing education, professional practice, and their motives for wanting to attend nursing school. Other variables included selected demographics, previous health care experience, previous college attendance, and part time versus full time status. Analysis of data indicated that prerequisite biology and English grades showed significant relationship with student success academically. But, another finding, though less significant, was new and exciting for the author at the time: faculty predictions of success gained from interviewing the applicant and reviewing the academic record was related to academic success.

A study completed in 1979 (Stronck) found subjective data from interviews to be unrelated to nursing program completion and the final GPA earned in the program. Prerequisite grade point average and entrance achievement test scores were found to be the most accurate predictors of program completion. Likewise, a study conducted in Illinois a few years later (Steinen, 1981) found that interviews and other subjective tools were not useful in predicting nursing program completion.

The most recent literature published that pertains to the value of interviews when used to screen students prior to acceptance into nursing programs was in the Journal of Nursing Education. Authors, Rosenberg, et al. (2007) are affiliated with the Rush University College of Nursing in Chicago, Illinois and its twelve month accelerated Bachelor of Science in Nursing (BSN) program. The program uses a structured personal interview as a part of the admission process and the researchers sought to determine if the interviews provide value in predicting successful program completion. The decision to include interviews, beginning in 2003, was determined to be a risk that included time and money. Even though the annual cost including salaried time, preparation and training of interviewers was $7,500, the annual tuition of $29,460 for just one student otherwise qualified but denied and replaced by a student with a greater likelihood of success, that cost was recovered. Applicants were asked an array of questions about their understanding of how nurses work, their experience in the health field, their personal characteristics, and why they are currently in school. Although attrition still occurs in the program, and because they cannot compare interview versus no-interview situations within the same program, they must compare their attrition rate with the attrition rate of the traditional BSN program at the same University where an interview is not utilized. The annual attrition rate for the accelerated program is 10-15% while the attrition rate for the traditional program is 20-30%.

The authors noted that as the interviewers became more experienced from year to year and more able to identify those applicants who were less likely to succeed, the number of students who are denied admission based on the interview has grown. They cite an example of a student who was exceptionally academically prepared but about whom the interviewers had concerns, because the student never mentioned caring as an integral part of nursing. The applicant was admitted to the program regardless of the concerns but failed the first clinical practicum. This confined study did find value in admission interviews for the accelerated program at their college. They determined that the ability to screen applicants who are less likely to complete the program is the right thing to do professionally and financially even if the number is small.

There is an obvious gap in the literature related to the effect of interviews on the ability to predict success in nursing programs. Very little research can be found related to the results of individual interviews when used in addition to standardized testing and prerequisite course grades, but it is obvious from recent attempts to study interviews as selective criteria that interest in the process is growing. It would benefit all who currently use interviews as a tool and all who are considering interviews as a tool to know more about the correlation of the interview to program completion.

CHAPTER 3

METHODOLOGY

Purpose of the Study

The purpose of this study is to determine the extent to which one independent variable, individual interview score, when paired with three other independent variables, college admission standardized test scores, specialized pre-nursing standardized test scores and prerequisite course grades, add to the predicted success of nursing students based on the dependent variable, the grade point average of 11 nursing courses at the time of graduation. Interviewing qualified applicants to select those most likely to complete a nursing program requires many hours and extensive planning and organization. Faculty members, other college personnel and professionals from the community are often asked to serve on a panel to interview and score prospective students, taking them away from other responsibilities. Appropriate space for the interviews must be identified, an interview tool for each student must be printed and provided to each interviewer, work schedules have to be reorganized, and stress levels for all involved are increased. Only qualified applicants are interviewed but there are usually two to three times more qualified applicants than available openings in the program; there can be up to 175 individual interviews to complete. Is it all a waste of time? Are we determining the same student outcome by evaluating other variables such as grade point averages and standardized test scores? This study seeks to determine if value is added to the selection process when interview results are combined with other other, more objective selection criteria such as standardized test scores and prerequisite course grades. The study addressed the following research questions:

1) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with college admission standardized test scores (COMPASS)?

2) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with specialized pre-nursing standardized exam scores (NLN Pre-nursing Exam)?

3) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with prerequisite course grades?

4) To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with college admission standardized test scores, specialized pre-nursing standardized test scores, and prerequisite course grades?

5) How does the gender of applicants relate to program completion of students in an associate degree nursing program? Fixed attributes of gender, age and race are available for each student but are not part of the competitive selection process at the college. However, it was decided that gender would be included in the study because this particular nursing program seems to have an unusually high number of male applicants who are accepted into the program. Textile mills within the community have closed or outsourced to other countries in recent years, giving many men and women the opportunity to return to school and prepare for another profession. Only about six percent of nurses in the United States are men. A summary of 209 students accepted into the program over the five year span included 25.8% men, and 23% of the graduates from the program over the five year span were men. Based on these percentages gender was added as an independent variable in the study.

6) Does an interview score predict the program completion of an applicant? Student success or outcome, for the purpose of this study, is generally program completion. More specifically, the individual student grade point average of the nursing courses at the time of graduation was calculated as the dependent variable to determine the specific correlation to each of the four independent variables, especially the interview variable. Only 151 students completed the program and earned a grade point average in the eleven nursing courses. These correlation studies do not take the entire interviewed population (209) into account to determine the probability of program completion in general, so the sixth question was added to the study to determine that probability through logistic regression in an effort to look at all possible answers.

Research Design

The design for the study is *ex post facto,* non-experimental. A correlation analysis incorporating longitudinal archival student data was utilized to examine the nature of the relationship of each of the independent variables to the dependent variable. Correlation analysis measures the strength between two quantitative variables and is positive when the relationship between the two is positive, so the first step of the study was to separately correlate each of the four independent variables to the single dependent variable. The study investigated longitudinal data from annual individual student selection criteria at the beginning of the program to the final grade point average of nursing courses for each student upon completion of the program for the years 2002-2007. Several higher education researchers, including Astin (1993), indicate that longitudinal data are relevant when determining the value of assessments.

A multiple linear regression analysis was used to determine which of the four independent variables best predicted the dependent variable, success in the program, which was determined by the final nursing grade point average. It was especially important to determine if

the interview score, when combined with one or more of the other independent variables, was predictive in determining which program applicants were most likely to successfully complete the program so a stepwise selection regression and best subsets regression were done. This involves beginning with an independent variable that best predicts the dependent variable and adding subsequent variables to determine the best combination. If the addition of the interview variable increases the ability to predict which students will successfully complete the program, the assertion can be made that the interview is valuable and worth the resources that are required to accomplish the interview process.

A logistic regression analysis was used to predict the probability of program completion that could be determined from each independent variable. This type of analysis allows the prediction of group membership, in this case successful program completion, by calculating the probability of success over failure. It also shows the relationship and the strength of the relationship between variables in the form of odds or ratios (Agresi, 1996).

Defining the Variables

A total of four independent variables were identified for this study, three being objective in nature and one subjective in nature. The grade point average of the 11 nursing courses was identified as the program outcome and was used for the dependent variable. These variables are shown in Table 1.

Table 1. Variables Used for Study

Independent Variables	Score Range	Dependent Variable
	0-4.0	Nursing Course GPA (N=11)
Prerequisite Course GPA (N=4)	0-4.0	
COMPASS Score	0-400	
NLN Pre-nursing Exam Score	0-100	
Individual Interview Score	0-25	

The grade point average for four prerequisite college courses (Prerequisite Course GPA), the first of the objective independent variables consists of grades earned in College Algebra, English Composition and Rhetoric I, Human Anatomy and Physiology I and Introduction to Microcomputers. Applicants to the program can begin taking these courses at the college at any time, or the grades can be transferred from other colleges or universities. The program policy states that the first passing grade (C or higher) in each course will be used for ranking in the selection process. Students may retake any course for a higher grade but only the first passing grade will be considered. These courses were selected by program faculty and the program manager as having the most important content related to the early courses in the nursing curriculum.

The second objective independent variable is the COMPASS score, the standard, computer-based placement exam produced by ACT that is given to all students upon admission to the college. The scores for the Reading, Writing, Pre-Algebra and Algebra sections of the exam are totaled for selection ranking purposes. Each section has a possible score range of 0-100 which indicates the number of correct answers expected out of 200 items, but the scores do not necessarily translate to a percentage. The computer-based program will present questions of

increasing difficulty to a student in each subject until a sufficient number are answered correctly to determine a score. Students take the exam upon entrance to the college and are allowed to retake it only once to increase their score; the retake is usually after the completion of Math and English courses. Applicants who have already attained degrees are not required to take the exam for admission to the college, but they must take it prior to the program application deadline so that the ranking process for selection is the same for every student.

The third objective independent variable is the National League of Nursing (NLN) Pre-Nursing Exam percentile score on a scale of 100. The college is a testing site for NLN and offers the exam several times throughout the year, but students may take the exam at other testing sites if they request an official copy of the results be sent to the college from NLN. It is difficult to track the number of times a student has actually taken this exam so policy does not limit the number of attempts for each student. The highest official percentile score submitted is used for ranking purposes.

The subjective independent variable used for this study is the individual interview score. Each student receives a score from each member of an interview panel based on responses to questions and scenarios posed by the panel. The interview tool was developed by faculty at the college and contains sections pertaining to the applicant's goals, reasons for choosing nursing, communication skills, critical thinking skills, problem solving skills, appearance, body language and grammar. The maximum score for the interview is 25. Scores from each interviewer are totaled and averaged to determine the score of the applicant. Students are allowed to participate in only one interview per selection cycle. However, if they are not selected and decide to compete the following year they must be interviewed again.

Successful completion of the program, for the purpose of this study, was identified as the grade point average of the nursing courses that comprise the program and thus became the dependent outcome variable. The program consists of 11 separate courses that include theory, lab and clinical hours for a total of 55 quarter credit hours that are shown in Table 2. If a student failed a nursing course and returned the following year to retake the course, both attempts were calculated into the nursing course grade point average.

Table 2. Nursing Courses that Comprise the Dependent Variable (N=11)

Course Code	Course Title	Quarter Credit Hours
NUR 101	Professional Practice I	2
NUR 102	Professional Practice II	5
NUR 103	Professional Practice III	3
NUR 104	Pharmacology and Dosage Calculation	5
NUR 105	Professional Practice IV	5
NUR 201	Professional Practice V	5
NUR 202	Professional Practice VI	5
NUR 203	Professional Practice VII	2
NUR 204	Professional Practice VIII	8
NUR 205	Professional Practice IX	5
NUR 206	Professional Practice X	5

Sample Selection

The study was conducted at an associate degree nursing program that is offered at a small technical college in Georgia. The college has a quarterly enrollment of 2500 – 3000 students with about a third of the total enrollment in health science programs. There are nine associate degree programs and five diploma level programs offered in allied health by the college. All degree and diploma programs utilize a competitive admission process similar to the associate

degree nursing program, including an interview. Usually, there are twice as many applicants to the nursing program as there are available openings, resulting in qualified applicants being turned away. Applicants must complete designated prerequisite courses in another major before competing for acceptance into the nursing program. The associate degree nursing program is eighteen months (six quarters) in length after the student is accepted into the nursing major. Prerequisite science and general education courses usually take at least two quarters prior to program admission and some general education courses can be taken after the student begins nursing courses. The program has full approval from the Georgia Board of Nursing and is fully accredited by the National League of Nursing Accrediting Commission (NLN-AC). The following information for each student was ranked to determine acceptance into the program:

1) Grade point average for College Algebra, English Composition and Rhetoric I, Human Anatomy and Physiology I, and Introduction to Microcomputers.
2) COMPASS Reading, Writing, Pre-Algebra and Algebra scores.
3) National League of Nursing (NLN) Pre-Nursing Exam percentile score.
4) Score from individual interview conducted by panel of interviewers using standardized tool.

Two-hundred nine (209) students were accepted into the program by a competitive selection process for the classes beginning 2002 through 2006, graduating from 2003 through 2007. Fifty-four members of the sample (25.8%) are men. The non-traditional student population at the college is reflected in the nursing program applicant demographics; students tend to be older, some returning to college to change their career path; racial and ethnic composition is diverse; and many students are the first in their family to seek post secondary education. Fifty-eight students of the 209 (27.8%) never completed the program, some due to course failure, some due

to relocation, and some due to family and financial responsibilities that changed in their life. Participants in the study included all 209 accepted students in years noted as a sample of a larger population of associate degree nursing graduates.

Data Collection

The nursing program faculty members and the program manager created a custom spreadsheet that calculates the rank of each prospective student in each of the four competitive areas, then calculates the overall results and forms a list of students in order of rank. Most of the raw data that is entered into the spreadsheet is obtained from the SCT Banner System that is produced by SunGuard Higher Education. For instance, specific course grades are located and entered for each student and the spreadsheet calculates the GPC for those courses; COMPASS scores are located and entered and the spreadsheet totals the score.

The interview score for each student is obtained from a tool that was developed by department heads of health science programs at the technical college (see Appendix for copy of tool). Twenty-five is the maximum individual score that can be obtained; scores from each interviewer are averaged and entered into the spreadsheet. The format for the tool includes direct questions that seek to determine the applicant's goals, their reasons for choosing the nursing profession, their ability to formulate ideas and communicate them to others, and their ability to think critically when given a situation or problem. The final section of the tool asks the interviewer to evaluate the applicant's appearance, body language, communication skills and grammar. Up to three bonus points can be given on the interview score if the applicant has completed a healthcare program or has experience working in the healthcare field. Each section of the interview form provides the total points possible for that group of questions and ample

space for writing notes. The tool is utilized by a panel that contains no less than three interviewers.

The interview panel size and composition varies each year, but the goal is to form the panel from a minimum of two faculty members and at least one person from outside of the school of health sciences at the college. An interview form for each student is provided for each panel member with instructions on the cover sheet. No other student information, such as grades and test scores, are provided to the panel. One faculty member serves as the leader and reviews the process with other panel members before beginning the scheduled interviews. Prospective students are scheduled in 20 minute increments and are ushered into a conference room by the lead panel member who introduces the student to the other members. The student is asked to sit at the head of the table, facing the interviewers. Direct questions and scenario or situation-based questions are asked by panel members at their discretion. The interview score sheets are totaled and averaged for each student after the entire interview process has been completed. The score is then added to the spreadsheet. All raw data entries into the spreadsheet are checked twice by two individuals, before the new class roster is finalized.

The ranking spread sheets are saved electronically on the college server and identified by year of graduation. The nursing program manager and dean of the school of health sciences at the college are the only two individuals with access to the compiled data. The president of the college gave permission to retrieve and use the data for this study, and Institutional Review Board consent was granted May 24, 2007. Data for this study was collected by compiling the data that was recorded for competitive selection each year from 2003 through 2007 into a spreadsheet as shown in Table 3. Student anonymity was maintained by assigning numbers rather than using names or pseudonyms.

Table 3. Example of Data Collection

ID	CMPS	PRE GPA	NLN	INTV	NUR GPA	GEND	Status
1	334	4	99	24	3.24	f	
2	330	4	90	24	3.46	f	
3	327	3.75	95	23.67		m	N
4	271	3.75	88	23.5	3	f	
5	332	2.75	86	22.16		f	N
9	324	3.25	95	20.6	2.9	f	
10	271	4	84	24	3.14	f	

Note. ID = Student Number; CMPS = COMPASS Score; PRE GPA = Prerequisite GPA; NLN = NLN Pre-nursing Exam Score; INTV = Individual Interview Score; NUR GPA= Nursing Course GPA; GEND = Gender; Status = N indicates non-completers.

Limitations of the Study

The following limitations of the study are noted:

1) Study involves only 209 associate degree nursing students from a small technical college in Georgia.
2) Composition of the interview panels varied in size and composition from year to year.
3) Inter-rater reliability was not determined for the interview scores.
4) Interview tool was created locally with minimum research, but same tool was used for each interview.
5) All graduates since the beginning of the program have been selected by rank with the inclusion of an interview score. There is not a sample of students to compare without the interview score.

Data Analysis

Correlation analysis was completed initially to compare the independent variables to the dependent variable to determine the relationships that exist and the strength of those relationships based on an alpha level of 0.05. Comparison of performance between nursing grade point averages of males and females was evaluated by a two-sample T-Test and CI. The

proportion of program completion between males and females was also evaluated. Multiple linear regression analysis by stepwise regression and analysis of variance were completed, also using an alpha level of 0.05, to determine which of the independent variables best predicted the dependent variable, the nursing course grade point average. Logistic regression analysis was used as an additional study to predict the probability of program completion due to the nearly 28% of students who never completed the program.

CHAPTER 4

FINDINGS

Purpose of the Study

The purpose of the study was to determine the effect of structured interviews on predicting the success of associate degree nursing students. Overall the goal was to test the interview variable separately and with other variables (prerequisite grades, Pre-Nursing NLN score and COMPASS scores) to determine if the interview predicts or adds to the prediction of the success of these students. Success, for the purpose of this study, was defined as program completion and more specifically as the grade point average of nursing courses. The results could indicate the need for adjustments to the overall acceptance policy. There could be justification for continuing the use of very time consuming interviews of associate degree nursing applicants or justification to discontinue the interview process entirely.

Participants

The participants in the study consisted of 209 students accepted into an associate degree nursing program at a small technical college in Georgia between 2002 and 2006. The students were accepted into the program based on a competitive selection process that ranks COMPASS scores, four prerequisite course grades, Pre-Nursing NLN exam percentile score and the average of individual interview scores. Descriptive statistics of these four variables can be seen in Table 4. The COMPASS scores of the students ranged from 188-395 with maximum possible score of 400. The Mean was high within the range at 310.33, however the breakdown of scores between reading and math sections, not shown in this data, indicates that the high totals were mostly due to Reading and Writing portions of the test; most students had significantly lower algebra scores.

The prerequisite course grade point average for accepted students ranged from 2.25-4.0 with maximum possible of 4.0. The Mean of 3.47 indicates that most of the accepted students had excellent grade point averages. The Pre-Nursing NLN exam percentile scores of the students ranged from 64-99 with a possible score of 100. Raw data from each year revealed only one year in which any accepted student fell below an 80 percentile on the NLN exam. The range of interview scores for accepted students was 9.75-25 with maximum possible score of 25. The Mean interview score of 22.18 could indicate a bias among raters. Efforts were made each year to select a diverse panel and to orient each member to the process. However, the tendency to give high scores persisted which could be an indication of the overall quality of individuals applying to the program. Students took a sequence of 11 nursing courses over six quarters for a total of 50 credit hours. The range of nursing course grade point averages at the time of program completion was 1.82-4.0 with maximum possible of 4.0. The Mean of 2.79, significantly lower than the prerequisite grade point average, could indicate the rigor of the program. Fifty four of the 209 students (25.8%) were male and 155 students (76.8%) were female. Fifty eight of the 209 students (27.8%) never completed the program. Of the 151 program completers 35 were male (23.2%) and 116 were female (74.8%).

Table 4. Descriptive Statistics of Variables (N=209)

Variable	N	Mean	SE Mean	StDev	Minimum	Maximum
COMPASS Scores	209	310.330	2.060	29.77	188.00	400.000
Prerequisite GPA	209	3.4677	0.028	0.40	2.25	4.000
NLN Exam Score	209	85.4160	0.605	8.75	64.00	100.000
Interview Score	209	22.1830	0.155	2.24	9.75	25.000
Nursing Course GPA	151	2.7895	0.032	0.39	1.82	4.000

Summary of Results

Prerequisite course grades and the pre-nursing NLN exam percentile score seem to be correlated and significantly linearly associated with the dependent response variable, the grade point average of the nursing courses, indicating that students who do well on the exam and have high grades in the prerequisite courses are more likely to complete the program with a higher nursing course GPA than those students with lower exam scores and nursing grades. The COMPASS score is also significantly associated with the nursing grade point average though less so than the NLN exam percentile and the prerequisite course grades. The interview score does not seem to be correlated with the grade point average of the nursing courses nor is it significantly linearly associated. This indicates that the interview variable is least important in predicting the level of the nursing course GPA at the time of program completion and the COMPASS score would be somewhat predictive. Correlations are depicted in Table 5. However, the pre-nursing NLN exam percentile score, the interview score and gender seem to be linearly associated with the probability of merely completing the program, whereas the COMPASS score and the prerequisite course grades do not seem to be significantly associated with the probability of program completion. This indicates that a student with a high interview score is more likely to complete the program than a student with a low interview score, but may not necessarily have a high nursing course GPA. Likewise, a student with a high pre-nursing NLN exam score would have a greater probability of completing the program. The generally high interview scores given to students by raters could be attributed to bias among raters or to the overall quality of the individuals applying for admission into the program, thereby reducing the ability of the interview score to predict the students who will complete with a higher GPA.

The results for the probability of program completion based on gender, indicates that females complete the program at a higher rate than males.

Table 5. Correlation of Independent Variables to Dependent Variables (N = 151)

Variables	COMPASS Score	Prerequisite Course GPA	NLN Pre-nursing Exam Score	Individual Interview Score
Prerequisite Course GPA	0.224 0.001	–	–	–
NLN Pre-nursing Exam Score	0.417 0.000	0.248 0.000	–	–
Individual Interview Score	0.035 0.614	0.092 0.185	-0.092 0.183	–
Nursing Course GPA	0.199 0.014	0.484 0.000	0.406 0.000	0.030 0.718

Note. Cell contents: Pearson Correlation
P-value

Results for Question One

To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with college admission standardized test scores (COMPASS)?

The individual interview scores were found to have a weak positive correlation but no significant linear association with the nursing course grade point average, indicating that the interview score is not a good single predictor of student success in the program. The comparison of the interview variable with the nursing course grade point value had a 0.0300 Pearson correlation and a 0.718 p-value (Table 5). A 0.00436 coefficient with a 0.809 p-value for the interview scores when combined with the COMPASS scores to predict the nursing course

grade point average implies that it is not significant with p-value higher than 5%, indicating that even when the two variables are combined the interview score does not change the value of the COMPASS score when predicting successful program completion. The regression equation for this test is NUR GPA = 1.88 + 0.00260 T1 CMPS + 0.0044 T4 INTRV. Results of the test can be seen in Table 6.

Table 6. Summary of Regression Analysis for COMPASS Score and Individual Interview Scores Predicting Nursing Course GPA (N = 151)

Predictor	Coef	SE Coef	T	P
Constant	1.8845	0.5094	3.70	0.000
COMPASS Score	0.00260	0.00106	2.46	0.015
Individual Interview Score	0.00436	0.01795	0.24	0.809

Note. S = 0.385717 R-Sq = 4.0% R-Sq(adj) = 2.7%

Results for Question Two

To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with specialized pre-nursing standardized exam scores (NLN Pre-nursing Exam)?

The individual interview scores were found to have a weak positive correlation but no significant linear association with the nursing course grade point average, indicating that the interview score is not a good single predictor of student success in the program. The NLN Pre-nursing Exam Score alone demonstrates a strong linear association with the nursing course GPA. However a 0.0128 coefficient with a 0.446 p-value (greater than 5%) for interview scores when combined with the NLN Pre-Nursing exam scores implies that there is no added value in

predicting the nursing course GPA when the two are combined. The regression equation is NUR GPA = 0.808 + 0.0197 T3 NLN + 0.0128 T4 INTRV and the results can be seen in Table 7.

Table 7. Summary of Regression Analysis for NLN Pre-nursing Score and Individual Interview Score Predicting the Nursing Course GPA (N = 151)

Predictor	Coef	SE Coef	T	P
Constant	0.8075	0.5062	1.60	0.113
NLN Pre-nursing Score	0.0197	0.0037	5.45	0.000
Individual Interview Score	0.0128	0.0673	0.76	0.446

Note. S = 0.359154 R-Sq = 16.8% R-Sq(adj) = 15.7%

Results for Question Three

To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with prerequisite course grades?

The individual interview scores were found to have a weak positive correlation but no significant linear association with the nursing course grade point average, indicating that the interview score is not a good single predictor of student success in the program. Prerequisite course grades are shown to have a strong linear association with the nursing course GPA, but when the interview score is added the resulting coefficient (0.0054) with a 0.737 p-value implies that there is no significant value added by combining the two variables; the p-value is greater than 5%. The regression equation is NUR GPA = 0.948 + 0.491 T3 GRDS + 0.0054 T4 INTRV and the results can be seen in Table 8.

Table 8. Summary of Regression Analysis for Prerequisite Course GPA and Individual Interview Score Predicting the Nursing Course GPA (N = 151)

Predictor	Coef	SE Coef	T	P
Constant	0.9478	0.4412	2.15	0.033
Prerequisite Course GPA	0.4908	0.0729	6.73	0.000
Individual Interview Score	0.0054	0.0160	0.34	0.737

Note. S = 0.344310 R-Sq = 23.5% R-Sq(adj) = 22.5%

Results for Question Four

To what extent do individual applicant interviews increase the predictability of the success of students in an associate degree nursing program when combined with college admission standardized test scores, specialized pre-nursing standardized test scores, and prerequisite course grades?

The individual interview scores were found to have a weak positive correlation but no significant linear association with the nursing course grade point average, indicating that the interview score is not a good single predictor of student success in the program. A 0.0101 coefficient with a 0.514 p-value for interview scores when combined with college admission standardized test scores, specialized pre-nursing standardized test scores, and prerequisite course grades to predict nursing course grade point average implies that it is not significant. Combining the subjective interview score to the objective variables does not strengthen the prediction of the nursing course GPA. The regression equation is NUR GPA = - 0.040 - 0.000070 T1 CMPS + 0.404 T2 GRDS + 0.0141 T3 NLN + 0.0101 T4 INTRV and the results can be seen in Table 9.

Table 9. Summary of Regression Analysis for COMPASS Score, Prerequisite Course GPA, NLN Pre-nursing Exam score and Individual Interview score Predicting the Nursing Course GPA (N = 151)

Predictor	Coef	SE Coef	T	P
Constant	-0.0402	0.5070	-0.08	0.937
COMPASS Score	-0.0001	0.0001	-0.07	0.944
Prerequisite Course GPA	0.4031	0.0734	5.50	0.000
NLN Pre-nursing Exam Score	0.0141	0.0373	3.78	0.000
Individual Interview Score	0.0101	0.0154	0.65	0.514

Note. S = 0.328871 R-Sq = 31.2% R-Sq(adj) = 29.3%

Based on the significant p-value of two of the variables, the prerequisite course grades and the pre-nursing exam scores, in the regression analysis shown in Table 9, a step-wise regression analysis using only these two variables was completed. The results again show p-values for both variables to be 0.000 which is significantly less than 5%. This indicates that both the prerequisite course grades and pre-nursing exam score are individually very good at predicting how high or how low a student's nursing course GPA will be at the time of program completion. The interview score and COMPASS score seem to add little value to the determination of which students will complete with a higher GPA.

Results for Question Five

How does the gender of applicants relate to program completion of students in an associate degree nursing program?

The nursing course average of the 116 females who completed the program is higher than the nursing course average of the 35 males who completed the program (Table 10) but it is not significantly higher with a difference of 0.11 and a 0.148 p-value which is greater than 5%.

Table 10. Program Completion of Male and Female Students (N=151)

Gender	N	Mean	StDev	SE Mean
Female	116	2.815	0.389	0.036
Male	35	2.705	0.392	0.066

The proportion of the female students that completed the program (116 of the original 155) is 74.8%. This is higher than the 64.8% of the male students that completed the program (35 of the original 54). The difference of 10% with a p-value of 0.204 is higher than 5% and therefore not significant. Men are usually considered to have a higher level of family obligation and this could have been primary reason that a lower percentage of men completed the program. However, the non-traditional population of this college, and therefore of the program applicants, includes many single mothers with no support from family members which could impact the female drop rate. The reasons, other than failure, that students left the program were not recorded.

Results for Question Six

Does an interview score predict the program completion of an applicant?

The main questions for this study were designed to determine if individual scores from student interviews add any value when combined with other criteria in the selection of a class for an associate degree nursing program. The nursing course grade point average at the time of program completion was selected as the variable to indicate successful program completion, but 58 of the 209 students had no nursing course grade point average indicating that they did not complete the program. These students withdrew from the program for various reasons. Some students failed two nursing courses and were ineligible to return. Others encountered family and financial obligations, illness, relocation, etc. Due to the number of drops, the correlation analysis

studies were carried out based on the remaining population number of 151. Therefore, a logistic regression analysis was completed to determine the odds or probability of a student completing the program versus not completing the program based on the results of each of the four independent variables, and the entire population of 209 was used to determine the probability. Although the linear regression models suggested that the interview scores were not good predictors of the nursing course grade point average, the logistic regression analysis suggested that interview scores might be able to predict the probability of a student completing the program regardless of the level of the nursing course GPA. Interview scores were determined to have a p-value of 0.000, lower than the 5% p-value level, indicating significance (Table 11). However, the high mean interview score of 22.18 should be recalled when reviewing this statistic.

Table 11. Summary of Logistic Regression Analysis of COMPASS Score, Prerequisite Course GPA, NLN Pre-nursing Exam Score and Individual Interview Score Predicting Probability of Program Completion (N = 151 completers and 58 non-completers)

Predictor	Coef	SE Coef	P	Odds Ratio
Constant	-10.5762	2.9817	0.000	
COMPASS Score	-0.0057	0.0065	0.374	0.99
Prerequisite Course GPA	0.8010	0.4227	0.058	2.23
NLN Pre-nursing Exam Score	0.0325	0.0211	0.123	1.03
Individual Interview Score	0.3284	0.0808	0.000	1.39

CHAPTER 5

DISCUSSION

Summary of Study

This study examined the extent to which individual interviews, when paired with college admission standardized test scores, specialized pre-nursing standardized test scores and prerequisite course grades, add to the predicted success of nursing students based on the grade point average of nursing courses at the time of graduation. Interview scores were paired with other independent variables to determine if correlation exists between the variables and the nursing course grade point average which was used as the outcome variable. The purpose was to ascertain if the time spent by members of the interview panels and the effort to coordinate the interviews is justified. It is important to evaluate practices periodically for the purpose of improving processes, especially considering the current nursing shortage in healthcare and the predictions that the need for nurses will escalate between now and 2020. The selection of students for the associate degree nursing program at a small technical college in Georgia has been in place for seven years without any critical review. The program has a completion rate that is similar to other programs and the pass rate of graduates on the NCLEX-RN licensure exam has been 86 – 96% every year, well above the Georgia Board of Nursing Examiners requirement of 80%. Three of the criteria evaluated for selection of students, COMPASS exam, NLN Pre-Nursing Exam and prerequisite course grades, are used by many other nursing programs and a large body of research can be found pertaining to their value related to outcomes. However, very little research related to the value of an individual student interview for nursing program selection can be found. This study was focused on the value of the interview alone and the value it adds when combined with other criteria to predict applicants who will complete the

nursing program related to GPA. The results indicate that interview scores do not predict what the nursing course GPA will be at the time of program completion. Even when interview scores are evaluated along with objective criteria such as prerequisite course grades and standardized exam scores, there is no added value to the prediction of successful program completion when related to the nursing course GPA.

The probability of program completion, regardless of the level of the nursing course grade point average, was also examined. Students have withdrawn from the program for a variety of reasons other than failure; family and financial obligations, illness, relocation, etc. Fifty-eight of the 209 members of the sample (27.8%) never completed the program and therefore had no nursing course grade point average. The logistic regression was completed to determine if the probability of program completion could be determined by the interview score. The COMPASS score, prerequisite course grade point average and the NLN Pre-nursing Exam Score were also evaluated by logistic regression. The conclusion of the logistic analysis seems to indicate that interviews can be significant indicators of whether a student actually completes the program or withdraws before completion. COMPASS scores are also related to the probability of program completion. However, assuming that students with higher grade point averages indicate a higher level on knowledge and understanding, it is more important to predict which criteria predict higher GPA at program completion. These students are expected to have a higher success rate on the NCLEX exam and should be more competent as a nursing professional.

The additional independent variable of gender was also examined. General demographics of age, race, ethnicity, etc. were available for all members of the sample but were not evaluated since they have no impact on the selection process. Gender was selected as a

variable because the program seems to have an unusually high number of male applicants. The community has undergone an industry shift in recent years with textile manufacturers and other businesses outsourcing to foreign countries. Men who have been in the workforce, many at management levels, are returning to college with federal funding to continue their education or to start a new career field. The nursing shortage has been widely publicized and jobs in hospitals and other health care facilities are readily available. This variable was added to determine if there is any relation to success based on gender, and the findings indicate that a higher proportion of females complete the program but the level of the nursing course GPA is not related to gender. Nearly 75% of female students completed the program, whereas 64.8% of the males completed the program. A lower completion rate for males could have been related to family responsibilities that required men to work more than females, taking away from class and study time. However, there many single mothers have been accepted into the program who could have encountered the same financial responsibilities, as well as responsibilities and time requirements related to child care. Students who left the program for reasons other than failure were not interviewed and reasons for departure were not determined.

The study identified a combination model using the NLN Pre-nursing Exam percentile scores and the prerequisite course grade point average as the best predictors of program success related to the nursing course grade point average. The NLN Pre-nursing Exam evaluates verbal skills as well as science and math knowledge and critical thinking skills and has been found to predict program completion as well as success on the NCLEX-RN (Wall, et al. 1993). It has been used for more that 60 years as an admission test for nursing programs and validation and reliability studies based on the NCLEX-RN exam pass rates are conducted frequently. Science course grades, one of which is included in the prerequisite course grade point average for this

study, are a consistent predictor of success in nursing programs (Campbell & Dickson, 1996). Lewis and Lewis (2000), Potolsky (2003) and Phillips (2002) also found that performance in prerequisite courses, typically anatomy and physiology, are predictive of nursing student success. Hultquist (1981) studied the success in an associate degree nursing program and found that chemistry and microbiology grades were good predictors, but she also found that work experience in the healthcare field had a positive relation to success of students in the programs. Students can gain up to three points on the interview score for previous work experience in healthcare in the selection process used for this study.

The interview score had a weak correlation but no significant linear association with the nursing course grade point average when evaluated alone or combined with any and all of the other variables. This is counter to the results of at least one earlier study. A research study completed by Zeidner et al. (1990) indicated that performance on interviews was a valid predictor of program success. That study also indicated a high importance of verbal ability and skills which are partially evaluated with standardized admission test scores. Interviews were found to be helpful in screening drop-outs in a study at Tel-Aviv University (Ehrenfeld & Tobak, 2000); attrition rate increased when interviews were not used. Interviews could be helpful in identifying family support prior to program admission. Jeffreys (1998) indicated that family support is important for high-risk, non-traditional students and could increase retention and success rates. However, the limited research related to interviews also reveals that interviews are generally subjective in nature and serve no predictive value as indicated in studies by Stronck in 1979 and again by Steinen in 1981.

The COMPASS scores reviewed in this study also had a weak correlation to the nursing course grade point average. Standardized tests, such as those produced by SAT and ACT, which

produces the COMPASS exam, have long been the object of research and controversy. Camara & Echternacht (2000) found them not to be good predictors due to the nonacademic influences on persistence and success that students experience during the educational process. Other researchers, including Adelman (1999), surmise that standardized test scores indicate general learned abilities and are decent predictors of student success, but they are influenced by gender, ethnicity, race and economic status. However, preadmission reading scores have been shown to have a relation to pass/fail rates in a nursing program (Liegler, 1997).

Gender does not seem to impact the success of students in this study. Although the proportion of females completing the program (74.8%) was higher than the proportion of males (64.8%), the difference is small. Many external factors, such as family, job and financial responsibilities, could contribute to the lower completion rate seen for males. Also, this college has accepted several males into the program who did not have a realistic concept of the nursing profession and withdrew after the first or second quarter to seek other careers.

Probability of program completion without regard to nursing grade point average indicated the reverse of the main study. Interview scores and COMPASS scores seem to be significant indicators of whether a student actually completes the program, although they have little value in predicting the nursing course GPA at the time of completion. The mean interview score of 22/18 in this study must be considered when evaluating this result. The prerequisite course grades and pre-nursing NLN Exam scores were not significant in determining program completion.

Regardless of the statistical outcomes related to the value of interviews found in this study, nursing program managers and faculty members must consider values not determined by numbers, qualitative opinions arrived at by nurses and other professionals when interviewing

prospective nurses. All applicants may not have that special "something" that it takes to become a good nurse. Perhaps an interview is useful in screening those applicants who would be a total disaster in the nursing profession! There may be value in the interview process beyond the questions and results of this study.

Implications for Practice

The associate degree nursing program at the technical college from which the data were collected, as is the case in any other competent nursing program, desires to select the students who are most likely to be successful in the program. Space in the programs is limited: ratios of students to faculty members are mandated by governing state boards and accrediting agencies; credentialed faculty members are difficult to recruit and retain; and availability of clinical space is becoming more and more limited. However, the nursing shortage continues to be critical and hospitals and other health care agencies in the community are constantly seeking more and more new graduates. It is imperative that nursing programs optimize their resources and reduce the amount of valuable resources that are expended on unsuccessful students every year.

Accepting potential successful students thus becomes the goal of every admission process. Many nursing programs include cognitive ability and personal qualities in the admission process (Salvatori, 2001), but if the students who are most likely to succeed with higher nursing course grade point averages can be determined without the laborious interview process then the goal has still been attained. The composite model of NLN Pre-nursing Exam scores and prerequisite course grades is objective, easy to calculate and will save time and money. The results of this study indicate that the composite model will have the same predictive value as the current process which also includes the interview score and the COMPASS score.

Recommendations

Several recommendations could be considered based on the results of this study. First, reconsider the evaluation of the interview as a part of the nursing program admission process and revise the method used to score the interview. It seems that the prerequisite course grades and NLN Pre-nursing exam results are good predictors of a high completion GPA, and interview scores do not add to the prediction. Interviews require a great deal of time commitment, planning and coordination and are easily biased due to subjective nature. However, interviews could still be an important screening tool by using different evaluative systems, such as requiring members of the interview panel to rank, rather than score, each applicant.

Second, reevaluate the prerequisite course requirements that are considered for admission, possibly adding more science and English courses. Several studies, including one in 2003 by Potolsky, Cohen and Saylor and one by Phillips, et al. (2002) indicate that performance in anatomy, physiology and microbiology can be a reliable predictors of nursing program success. The study completed by Phillips also indicated that English grades were predictors of student success in nursing programs. Other studies have related reading comprehension and English grades to success in nursing programs as well.

Third, continue to include the NLN Pre-nursing Exam score as an admission criterion. This exam has been shown to be a very good predictor of nursing program success in this study as well as many others. This study seemed to conclude that when combined with prerequisite course grades, the prediction was even stronger.

Fourth, reevaluate the need for the entire COMPASS score as an admission criterion; reading and writing portion of the test may be most valuable. A study by Phillips, et al. (2002)

showed that 85% of students in the study completed the nursing program successfully when reading scores were used a selective criteria, but only 75% of the students completed the program when reading scores were not used as a selection criteria. A study done by Yellen and Geoffrion (2001) found entrance reading exam scores to be significantly different between passing and non-passing groups of nursing students. Critical thinking, essential in nursing practice as well as program completion, involves inferential reading, determining main ideas in content and predicting outcomes. At least two producers of pre-nursing tests, NLN and ELI, incorporate reading and critical thinking into their exams.

Limitations of the Study

This study used a small sample of nursing students at a single technical college. Larger data bases could be accessed for broader results. The interview panels have varied in member composition and size and inter-rater reliability has not been built into the process. The interview tool was created locally by faculty members and program managers with only a minimum of research. The tendency of interviewers to give high scores may have limited the outcome of the study as well. Probably the limitation with the most impact was the lack of an alternate group of students who were accepted into the program without the interview process.

Implications for Further Research

One great debate in higher education revolves around valid predictors of college success! Research will continue to study cognitive and non-cognitive attributes and how they impact success. Research should also focus on best practices that will ensure success after students have been accepted into a college or program.

Specific to this study, more research aimed at improving selection processes for nursing programs is needed. Broader samples should be evaluated, samples that have varying entrance

requirements, so that the impact of each requirement on the outcome can be determined. Creating a state or even national data base would be of great benefit in the evaluation of the best predictors of success. Prerequisite courses seem to be valid indicators of nursing program success, but more research is needed to determine which courses are the most valid. Science courses in general, but more specifically biology, are important but verbal skills are important as well. What combination will best prepare the student and thus best predict the success?

An entire study could focus on the applicants who were qualified but not selected. Did one aspect of the selection process result in a low score or did they score poorly in each ranking category? What advisement did they receive and what avenues did they pursue? Was there success in another program?

Non-completers in this study were not tracked and reasons for their failure or withdrawal were not pursued. Perhaps a future study could focus on the students who withdraw from the program to determine their major challenges and reasons for leaving the program. Even when the reason is obvious, such as course failure, there may have been obstacles that prevented them from spending the necessary time on course work. Understanding the various reasons over a period of time could enable faculty and other college personnel to develop intervention strategies to assist students in particular ways. Perhaps the most valuable research would be studies aimed at ensuring success once the student has been accepted into the program. What elements of student support, such as tutoring, financial assistance, and mentoring, will create a successful and competent nurse? How can the attrition rate be lowered? What goals should be set for the students and how can faculty help students reach those goals?

Many research studies have been conducted that are related to predicting student success, but no common agreement has been reached, no predictors proven 100% successful. Even with

the development of state or national data bases, the answer might lie with local research that pertains to the individual program, college or university, and community demographics; determining what admission criteria have predicted success in the past and what focus is needed to reduce attrition in the future. The answer may come through qualitative research or a combination of qualitative and quantitative studies.

The nursing shortage is critical! Utilizing faculty and program resources in the best possible way is crucial. Criteria used to identify students who are more likely to succeed in a program and become licensed as a nurse should be precise and must go beyond essential competencies. Therefore, continued research is an important factor in determining the selection of this country's future nursing force.

REFERENCES

Adelman, C. (1992). The way we are: The community college as American thermometer. Washington, DC: U.S. Dept. of Education, Office of Educational Research and Improvement.

Adelman, C. (1999). Why can't we stop talking about the SAT? *Chronicle of Higher Education, 46*(11), B4-6.

Argresti, A. (1996) *An introduction to categorical data analysis.* Hoboken, NJ: John Wiley and Sons, Inc.

Astin, A. W. (1993). *Assessment for excellence*. Westport, CT: The Oryx Press.

Bean, J. P., & Metzner, B. A. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research*, *55*(4), 485-540.

Buerhaus, P., Staiger, D., & Auerbach, D. (2003). Is the current shortage of hospital nurses ending? Emerging trends in employment and earnings of registered nurses. *Health Affairs*, 22(6), 191-198.

Camara, W. J., Echternacht. (2000). *The SAT[R] I and high school grades: Utility in predicting success in college. Research Notes*. College Entrance Examination Board. U.S.: New York.

Campbell, A. R., & Dickson, C. J. (1996). Predicting student success: A 10-year review using integrative review and meta-analysis. *Journal of Professional Nursing*, *12*(1), 47-59.

Clegg, R., & Ostrowsky, L. (1999). Test guidelines will coerce colleges and cheat students. *Chronicle of Higher Education, 45*(43), B8-12.

Edwards, J. C., (1990). The interview in the admission process. *Academic Medicine, 65*(3), 167-177.

Ehrenfeld, M., & Tobak, N. (2000). Value of admission interviews in selecting undergraduate nursing students. *Journal of Nursing Management, 8*(2), 101-107.

Ellis, S. O. (2006). Nurse entrance test scores a predictor of success. *Nurse Educator,* 31(6), 259-263.

Gallagher, P. A., Bomba, C., & Crane, L. R. (2001). Using an admissions exam to predict student success in an ADN program. *Nurse Educator, 26*(3), 132-135.

Gramet, P., & Terragina, L. (1988). Qualitative and quantitative variables in a selective admissions process. *College and University, 63*(4), 368-373.

Hall, F. R., Regan-Smith, M., & Tivnan, T. (1992). Relationship of medical students' admission interview scores to their dean's letter ratings. *Academic Medicine, 67*(12), 842-845.

Hynes, P. & Bennet, J. (2004). About critical thinking. *Canadian Association of Critical Care Nurses 15*(3), 26-29.

Hultquist, L. L. (1981). Admission variables as predictor of success in an associate degree nursing program. *Dissertation Abstracts International - A, 42*(04), 1508.

Jeffreys, M. R. (1998). Predicting nontraditional student retention and academic achievement. *Nurse Educator, 23*(Jan/Feb), 42-48.

Johnston, R. (2000). Causes of nursing shortage no mystery. Reno Gazette-Journal. Reno.

Lamm, G., & McDaniel, A. M. (2000). Factors that predict success on the NCLEX-PN. *Journal of Nursing Education, 39*(7), 316-317.

Lewis, C., & Lewis, J. H. (2000). Predicting academic success of transfer nursing students. *Journal of Nursing Education, 39*(5), 234-236.

Liegler, R. M., (1997). Predicting student satisfaction in baccalaureate nursing programs: Testing a causal model. *Journal of Nursing Education, 35(Oct), 357-364.*

McLaughlin, K., Moultray, M., & Muldoon, O. (2007). The role of personality and self-efficacy in the selection and retention of successful nursing students: a longitudinal study. *Journal of Advanced Nursing, 61*(2), 211-221.

Merriam, S. B. &. S., Edwin L. (2000). *A guide to research for educators and trainers of adults.*

Mikitovics, A., & Crehan, K. D. (2002). Pre-professional skills test scores as college of education admission criteria. *Journal of Education Research, 95*(4), 215-223.

Oliver, D. H. (1985). The relationship of selected admission criteria to the academic success of associate degree nursing students. *Journal of Nursing Education, 24*, 197-206.

Ostrye, M. E. (2001). Predicting NCLEC-PN performance for practical nursing students. *Nurse Educator, 26*(4), 170-174.

Paszczyk, S. L. (1994). *A comparative analysis of ACT scores and final GPAs of Chicago State University undergraduate students.* U.S.; Illinois. Chicago State University. (ERIC Document Reproduction Service No. ED370519)

Patrick, L. E., Altmaier, E. M., Kuperman, S., & Ugolini, K. (2001). A structured interview for medical school admission, phase 1: Initial procedure and results. *Academic Medicine, 76*(1), 66-71.

Phillips, B. C., Spurling, M. A., & Armstrong, W. A., (2002). Associate degree nursing: Model prerequisites validation study in California community college associate degree nursing programs. San Francisco: The Center for Student Success.

Potolsky, A., Cohen, J., & Saylor, C. (2003). Academic performance of nursing students: Do the prerequisite grades and tutoring make a difference. *Nursing Education Perspectives, 24(*5), 246-250.

Roberts, D. A. (2002). The effects of ranked and non-ranked selection criteria on the success of California community college associate degree nursing students. *Dissertation Abstracts International - A, 62*(12), 5646.

Rodriguez, R. (1996). Test-driven admissions. *Black Issues in Higher Education,* 13(4), 7-10.

Rosenberg, S. P., Perraud, S., & Willis, L. (2007). The value of admission interviews in selecting accelerated second-degree baccalaureate nursing students. *Journal of Nursing Education,* 46(9), 413-416.

Rosseter, R. (2001). Enrollments rise at U.S. nursing colleges and universities; Enrollment increase insufficient to meet the projected need for new nurses. *American Association of Colleges of Nursing,* December.

Salvatori, P. (2001). Reliability and validity of admissions tools used to select students for health professions. *Advance in Health Sciences Education, 6*(2), 159-175.

Salzman, S. A. (1991). *Selecting the qualified: Predictors of student teacher performance*. U.S.; Idaho. Association of Teacher Educators. (ERIC Document Reproduction Service No. ED330672)

Sayles, S., Shelton, D., & Powell, H. (2003). Predictors of success in nursing education. *Association of Black Nursing Faculty Journal, 14(*6*)*, 116-120.

Shehane, D. R., (1994). *Admission significance parameters of the radiologic technology program*. U.S.; Tennessee. Mid-South Educational Research Association. (ERIC Document Reproduction Service No.ED382140)

Smittle, P. (1995). Academic performance predictors for community college student assessment. *Community College Review*, *23*(2), 37-46.

Stieren, P. (1981). Predictors of success for SICCM/ADN students. *Journal of Studies in Technical Careers, 3(1),* 27-43.

Stronck, D.R. (1979).Predicting student performance from college admission criteria. *Nursing Outlook, 27(9), 604-607.*

Villeme, M. G., (1983). *The Use of Student Background Variables, ACT Scores and GPA to Predict Performance on the Florida Teacher Certification Examination*. U.S.; Florida. National Council on Measurement in Education. (ERIC Document Reproduction Service

No. ED235229)

Wall, B., Miller, D. E., & Widerquist, J. G. (1993). Predictors of success on the newest NCLEX-RN. *Western Journal of Nursing Research, 15*(5), 628-643.

Yellen, E., & Geoffrion, A. (2001). Associate degree nurse success in NCLEX-RN, predictors and implications. *Nurse Educator, 26*(5), 208-211.

Zeidner, M., Kremer-Hayton, L., & Laskov D. (1990). Scholastic aptitude, matriculation grades, and group interview as predictors of performance in nursing school. *Assessment and Evaluation in Higher Education, 15*(1), 45-59.

Zinatelli, M., & Dube, M. A. (1997). A structured interview for selection of graduate students. *Chemical Engineering Education (CEE), 31*(4), 210-213.

Zwick, R. (1999). Eliminating standardized tests in college admissions. *Phi Delta Kappan, 81*(4), 320-325.

APPENDIX

Associate Degree in Nursing Interview Tool

Name of Applicant_____ Total Points

Signature of Interviewer_____ Date of Interview_____

Description

The interview questions are divided into specific categories. Each category is assigned a maximum number of points. The total possible number of points is 25.

The score assigned to each candidate by each interviewer will be averaged. This average score will be assigned to the candidate as his/her interview score for ranking purposes.

Use of the Tool

The interview questions are intended to invoke answers from the candidates. The questions may not have a "right" or "wrong" answer. More importantly, evaluation should be related to his/her ability to demonstrate competency in critical thinking and communication and genuineness of response.

It is not intended that every question in every category will be asked. Which questions and the number of questions asked may be guided by the interviewee's response to a particular question or general comments.

Every attempt will be made to be consistent during the interview.

	Possible	Comments
Decision to become a nurse	**2**	
*Describe what interests or excites you the most about becoming a nurse? *Describe what or who had the most influence in your life to select nursing as your career? *If you had a previous career, what prompted the change to nursing? *Why did you choose CTC to complete your nursing education?		
Definition or Philosophy of Nursing	**2**	
*What does nursing mean to you? *Do you think nursing is an art or a science and why? *How would you describe an ideal nurse?		
Priorities	**2**	
*Where does your goal of achieving an RN rank in your life priorities? *What is your priority goal for 5 years from now? *Discuss your plan of action if you have a test tomorrow but need to work tonight.		
Qualities	**3**	
What qualities do you possess that would make you a good nurse? *If we asked one of your instructors to describe you, what would they say? *Describe your study habits. *Describe 3 qualities you think best describe an ideal nurse. *Describe a confrontational situation you have been involved in and how you handled it. *Describe your favorite teacher/boss and why? *Describe your work ethic. * How many times in the last 2 yrs have you been absent from work or school?		
Completion of the Program	**2**	
*What barriers exist that might prevent you from completing the program? *How do the significant people in your life feel about you entering this program? *What one thing do you think would assure your success in this program? *If we told you that you should not work while you are in this program, what would you say?		
Expectations	**2**	
*Describe how much time you anticipate spending in study and preparation for nursing classes? *What do you expect from your faculty?		

*What is your responsibility as a student in a professional program?		
Experience	**3**	
*Describe your experience working in the health care field. *Describe any volunteer work you have done related to healthcare. *Describe how you feel the work you did will help you in this program. *Give an example of a positive/negative experience with a professional nurse. What would you have done differently?		
Critical Thinking Exercises	**4**	
*Finish the sentence: Learning is… *Which is more important, knowledge or wisdom? *You are taking care of 4 patients. They all call out to the desk at the same time with the following request. How would you handle them? a. a pt wants something to drink b. a pt needs a dressing changed c. a pt need to go to the bathroom d. a pt need something for pain *During an exam you see someone cheating. What would you do? Now what if it were your best friend? *A patient has just accused you of stealing money out of her bedside table. What would you do? *Your patient has requested no treatment for his end of life condition, including food or water. It has now been 5 days since he has had anything to eat or drink. Describe how you would personally deal with this situation. *You are taking care of a patient who is having a procedure you are morally and ethically against. What would you do? *Is it more important to "do no harm" to a patient or "do good" (beneficence) to a patient? *Describe what you would do if your values or ethics did not agree with those of your employer. *Is it ever right not to give a patient complete and honest information about his/her health condition. Why or why not?		
Communication Skills	**3**	
How well did the applicant demonstrate: ~logical flow of ideas ~appropriate grammar ~feasibility of content		
Observations	**2**	
How well did the applicant demonstrate: ~appropriate appearance		

~appropriate body language		
Bonus Points	**1 - 3**	
Work experience in healthcare or previous completion of healthcare program		
TOTAL		