

DEMOGRAPHIC AND ACADEMIC PREDICTORS OF LICENSED PRACTICAL  
NURSE STUDENT SUCCESS ON THE NCLEX-PN LICENSURE EXAMINATION

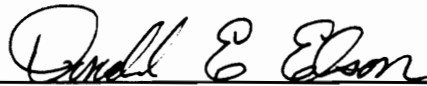
by

Ruth B. Young-Richardson, RN

A Dissertation submitted to the Graduate Faculty Virginia  
Polytechnic Institute and State University in partial  
fulfillment of the requirements for the degree

DOCTOR OF EDUCATION

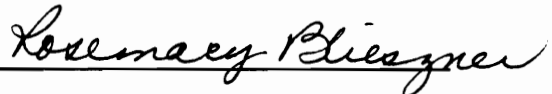
APPROVED:



Dr. Donald E. Elson, Chair



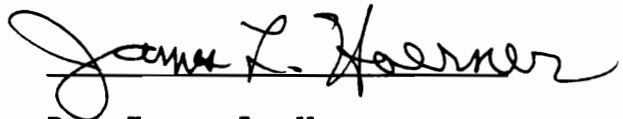
Dr. F. Marion Asche



Dr. Rosemary Blieszner



Dr. Curtis R. Finch



Dr. James L. Hoerner

February 16, 1996

Blacksburg, Virginia

**Key words:** NCLEX-PN, Licensure Exam, Predictor, Practical  
Nursing Success

**DEMOGRAPHIC AND ACADEMIC PREDICTORS OF LICENSED PRACTICAL  
NURSE STUDENT SUCCESS ON THE NCLEX-PN LICENSURE EXAMINATION**

**BY**

**RUTH B. YOUNG-RICHARDSON**

**COMMITTEE CHAIRMAN: DONALD E. ELSON, PhD**

**DEPARTMENT OF VOCATIONAL AND TECHNICAL EDUCATION**

**(ABSTRACT)**

The purpose of this study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban postsecondary practical nursing program could predict students' performance on the National Council Licensure Examination for Practical Nursing (NCLEX-PN). The research questions were: (1) what proportion of the variance in NCLEX-PN performance is associated with a combination of academic variables and demographic variables? (2) What proportion of the variance in NCLEX-PN performance is associated with academic variables? (3) What proportion of the variance in NCLEX-PN was explained by demographic characteristics? (4) What set of variables provide the best prediction of the NCLEX-PN scores?

The population, N= 261, used for this ex post facto study consisted of postsecondary practical nursing graduates who wrote the NCLEX-PN examination between 1982 and 1987. There was one dependent (criterion) variable for this study,

student scores on the NCLEX-PN. There were seven independent (predictor) demographic characteristics and five independent (predictor) academic variables. The data were obtained from student records between February and May 1992.

Data were analyzed using the Number Cruncher Statistical System (NCSS), an advanced statistical analysis software package. Multiple linear regression analysis was considered appropriate for this study because the approach was consistent with professional and research literature and this study used dichotomous and continuous predictor variables. Results of the data analysis indicated the following:

Based on the data analysis, demographic variables as a set were not predictors of success on the NCLEX-PN. However, with this population, the number of minor children under sixteen years of age in the students' families accounted for 6% of the variance in the NCLEX-PN.

The academic set of variables accounted for the greatest amount of variance in the NCLEX-PN. Sixty-nine percent (69%) of the variance in NCLEX-PN performance is explained by scores on the PNEE and four NLN Achievement Tests: Mental Health, Pharmacology, Maternity Nursing and Nursing of Children.

Recommendations for further study included investigations into the relationships between specific content examinations in the NLN Achievement Tests and

performance on the NCLEX-PN and further data analysis be conducted to determine if there are academic variables or demographic variables that stand alone as predictors of success on NCLEX-PN.

## DEDICATION

The work of this dissertation is dedicated to the memory of my parents, Clementine L. Henderson Young and Clyde L. Young; my grandmother, Elsie N. Henderson; my brother William C. Young, Sr.; and my niece, Debra M. Young. These loved ones sacrificed, cared and in various ways supported my efforts to complete this educational achievement.

## ACKNOWLEDGEMENTS

All thanks and praise to Almighty God for the many blessings he has bestowed upon me and my family. A number of people are given special thanks and recognition for my being able to conduct and complete this study.

The writer wishes to acknowledge with sincere appreciation the constant support, advice and professional assistance received from members of my dissertation committee: Dr. Donald E. Elson, Chairman, Dr. F. Marion Asche, Researcher, Dr. Rosemary Blieszner, Dr. Curtis R. Finch, Dr. Charles A. Pinder, and Dr. James L. Hoerner. The work of this research was enhanced because of the special contributions and assistance of the following: Dr. Richard A. Albert and Dr. Catherine VonVonno for their expert statistical assistance; and Dr. Joyce G. Bowles, Dr. Elizabeth S. Smith, Mrs. Janice Crouch, and Mrs. Alice E. Harvey for their patience and support while completing this process. Special thoughts are held for the late Yvonne Jones who stood by me through her time of trouble; and to Gloria A. Young, Renee Young, and Tim VonVonno who gave many hours to assist with typing of this document and my nephew Barnett J. Andrews, who assisted me in a special way.

Special thanks and deep gratitude is extended to my husband, Marion W. (Mario) Richardson. His love,

understanding, constant care, and friendship gave me strength in my darkest hours and gave me courage to face all obstacles. To my children, Marilyn, Edwina (Wendy), Charles and Mario, thank you for being understanding and caring about my desire for the higher goals in life. To my sister, Carrolyn N. Andrews, and my friends Dr. Edith H. Ward, Dr. Mercedes M. Dickson, M. Ardell Thompson, and Sally Littlejohn Dorsey a special thanks for being with me through this process. Finally, to my late dog "Snowball" who was with me at all times and through all obstacles, she is sorely missed.

This writer is extremely fortunate to have family, friends, associates, and co-workers who gave encouragement, support, inspiration and assistance during the development of this study.

## TABLE OF CONTENTS

	Page
Abstract .....	ii
Dedication .....	iv
Acknowledgements .....	v
List of Tables .....	ix
List of Appendices .....	x
CHAPTER	
I. INTRODUCTION.....	1
Background Information.....	2
Purpose of the Study.....	9
Research Questions.....	9
Significance of the Study.....	9
Definition of Terms.....	10
Variables Included in Study.....	12
Limitations of the Study.....	13
Summary.....	13
II. REVIEW OF THE LITERATURE.....	15
The Continued Need for Licensed Practical Nurses.....	16
Overview of Academic Preparation for Licensed Practical Nurse Students.....	17
Standardized Tests as Predictors of Success for Nursing Students in Diploma, Associate Degree and Baccalaureate Degree Programs.....	19
Academic Variables as Predictors of Success for Nursing Students in Diploma, Associate Degree and Baccalaureate Degree Programs.....	24



Research Concerning Nursing Students Identified as At-Risk Populations.....	27
Ethnic Concerns and Success on NCLEX Examinations.....	34
III. RESEARCH DESIGN AND PROCEDURES OF THE STUDY	
Design of the Study.....	39
Population.....	39
Test Instruments.....	42
Data Collection Procedure.....	43
Treatment of Data.....	46
IV. PRESENTATION AND ANALYSIS OF THE DATA	
Presentation of the Data Analysis.....	49
Research Question #1.....	49
Research Questions #2.....	50
Research Question #3.....	54
Research Question #4.....	54
V. SUMMARY, CONCLUSIONS, DISCUSSION, AND IMPLICATIONS AND RECOMMENDATIONS	
Summary.....	59
Conclusions of the Study.....	64
Discussion of the Findings.....	65
Implications and Recommendations.....	69
REFERENCES .....	72
APPENDIX A .....	77
APPENDIX B .....	80
APPENDIX C .....	82
VITA .....	85

LIST OF TABLES

Table	Title	Page
1	Demographic Characteristics of Practical Nurse Graduates who Graduated and Wrote the Licensing Examination Between 1982 and 1987, N = 261 .....	41
2	Multiple Regression Report of Demographic Characteristics and Academic Variables on NCLEX-PN Scores, N=261 .....	51
3	Multiple Regression Report: Academic Variables on NCLEX-PN Scores, N=261 .....	53
4	Multiple Regression Report: Demographic Characteristics on NCLEX-PN Scores, N=261 .....	55
5	Stepwise Regression Report of Significant Academic Variables on NCLEX-PN Scores, N=261 .....	57

LIST OF APPENDICES

Appendix	Title	Page
A.	Request for Permission to Conduct the Study .....	77
B.	Letter from Superintendent of D.C. Public Schools Granting Permission to Conduct Study .....	80
C.	Intercorrelation Matrix .....	82
D.	Vita .....	85

**CHAPTER I**  
**INTRODUCTION**

Licensed Practical Nurses (LPNs) provide nursing care for clients in a variety of settings. Their services have been focused primarily in acute care settings, such as hospitals. LPNs, as a specialty group of health care providers, evolved because of the need for more direct patient care providers in health care settings and because of their knowledge of basic nursing care skills (Kurzen, 1989). Licensed Practical Nurses continue to be needed in health care settings. Unfortunately, there has been a shortage in the number of persons attracted to this paraprofessional role in health care as a career of choice (U. S. Department of Health and Human Services, 1990b).

Among the many reasons for the LPN shortage has been the lack of information concerning what may make a person successful when attempting to complete the required program of study and what student characteristics may facilitate the students' successful completion of the National Council Licensure Examination for Practical Nurses (NCLEX-PN). Although some aspects of this dilemma have been found in the historical development of paraprofession groups, the focus

of maintaining a viable pool of LPN resources will be critical to the implementation of health care reform initiatives for the 1990s ( U.S. Department of Health and Human Services, 1990a). Ensuring access to the nursing profession and to health care services for under-served, minority, and disadvantaged populations will provide other important role(s) for LPNs. Renewed interest in LPN education has come at a time when the demand for nursing personnel has increased in long-term care settings and nursing home settings (Rosenfeld, 1990). This interest has been related to concerns about enrollments, progression and graduation from the LPN program and more importantly, success (a passing score) on the NCLEX-PN.

### **Background Information**

#### **Development of Practical Nursing as a Career Option**

Practical nursing predates the 1860s. The knowledge and skills for nursing patients were often handed down from one female family member to another, based on the instructions of the family physician, or they were learned from a midwife. It was a time when home nursing was done by women with practical experiences based on the nurturing role of women rather than on programs that provided formal education. The skills learned in home employment were

important for various reasons: physician shortages, inadequate transportation and communication channels, and other limiting features of the geographical setting and/or of the skills available in the population (Kurzen, 1989).

Kurzen (1989) further described how population shifts from rural to urban areas created situations in which young women were limited to domestic and home services for primary employment opportunities. This role seemed to have been a logical course to follow since the duties provided by the female nurse were consistent with the role expectations and the available employment options of the time. Yet, there was no formal training and there were no formal means for accountability for the acts of those practicing (Ross, 1981; Kurzen, 1989).

In 1892, Miss Lucinda Ballard opened the first practical nursing program at a YWCA in New York (Kurzen, 1989). This was the first time that a prescribed course of study was implemented, standards were established, and attention was given to the impact of practice on the population served. Practical nursing programs have grown from the YWCA format to formal academic programs of instruction and clinical experiences that are typical of the 1990s. Today LPN programs must meet rigid standards, present themselves for external evaluation and have responsibility for preparing safe practitioners to minister to the health needs

of the public. External evaluating agencies, e.g., State Boards of Nursing and the National League for Nursing Council of Licensed Practical Nursing, have defined standards of performance for nursing program curricula, faculty, and students. Accountability for safe practice has been quantified by the National Council Licensing Examination (NCLEX-PN), which serves as the indicator for safe practice (Matassarini, 1989). In order to meet the need for increased numbers of LPNs, there needs to be some methods developed to ensure retention and graduation of students from LPN school programs.

The concerns of this researcher were related to developing methods to predict students' success on the NCLEX-PN. Of special importance was the description of student characteristic and academic variables that may predict success for disadvantaged and minority populations. Retention and graduation of LPN students has been a most pressing concern.

### **Barriers to Success in LPN Programs for Minority and Disadvantaged Students**

Graduates of Licensed Practical Nursing programs must achieve a passing score on the licensure examination in order to practice nursing. Wakelyn (1988) noted that as a group, disadvantaged and minority students, especially

Blacks, tend to have more difficulty than other student populations in achieving success in academic programs and on licensure examinations. This phenomena may create student perceptions that, because their peers have not been successful in a LPN program, they may have the same problem. Further, the lack of role models in the work force may convey discouraging messages to potential students. These experiences coupled with other academic and demographic variables may cause increased hesitation in any attempt for minority students to enter preparation for the LPN role.

Tucker-Allen (1991) gathered data from minority students, Blacks, Hispanics, and Asian-Pacific Islanders, to ascertain how they felt about their educational experience in a large urban university setting. Analysis of data indicated that Black students were more aware of differences between themselves and other minority students and viewed themselves as high risk or disadvantaged. Among the recommendations from this study, the need for a variety of support programs seemed to be most desired by all subjects. Academic support, financial aid, interpersonal support activities, and programs that enhance feelings of belonging may be some of the types of support systems that could ensure retention and graduation of all students from LPN programs. These types of programs may also facilitate success on the NCLEX-PN (Wakelyn, 1988).



## Academic Variables and Demographic Characteristics:

### Predictors of Success in Nursing

Various problems and issues related to LPN students need to be investigated. Crane, Wright, and Michael (1987) studied 418 students enrolled in a diploma nursing program. The ethnic composition of the subjects was Hispanic, Asian, White and Black. These researchers were interested in describing key variables associated with standardized tests or other school factors, i.e., grade point average (GPA), which could facilitate selection of candidates most likely to succeed in one of three types of nursing programs, associate, diploma, or baccalaureate. Predictor variables were thought to include: age, high school grade point average, grade point average (GPAs) in three prerequisite courses, and prerequisite total GPA. These researchers concluded that selected National League for Nursing (NLN) achievement measures offered comparable and slightly higher predictive validity than the total GPA; the High School-GPA was of little value for any group studied; and prerequisite course work taken in the community college provided high predictive validity for Blacks in the prediction of total GPA. The most promising predictor variables for all groups were GPA earned in prerequisite courses, total reading scores, and the math concepts and applications sub-tests scores.

The variables presented in this study have not been researched in the LPN student population. However, it would be expected that similar types of variables, when applied to LPN student populations, may provide similar results. Crane et al, (1987) indicated that information about these variables as applied to RNs would serve to assist faculty in implementing academic support programs that may facilitate LPN student success.

Jenks, Selekman, Bross, & Paquet (1989) used an ex-post facto design to identify predictors of success on the NCLEX-RN and to determine the optimal time for identifying students at risk. The sample of convenience consisted of 407 graduates of a baccalaureate nursing program between 1984 and 1987. Their findings indicated that students at risk can be identified at the end of the junior year. This could be one point in the student's progression plan to introduce enrichment and support programs.

McKinney, Small, O'Dell, and Coonrod (1988) concluded that students at risk of failure on the NCLEX can be identified early based on their academic patterns. If some determinations of the student's strengths and weaknesses were made before admission, there would be optimal time to plan to meet student needs. Such an approach would provide the greatest opportunity to utilize support services and to

facilitate success in the academic program as well as on the NCLEX-PN.

Gaining a better understanding of academic, demographic, and sociological variables that alone or in combination provide predictors of success in LPN programs will help increase the available pool of LPNs for nursing care in all settings. Because there is such limited information in the literature about predictors of success for Blacks and disadvantaged groups in LPN programs, this researcher sought to fill this gap. There is a much needed role for the LPN that could ensure access to health care and participation in health care services for under-served populations. LPNs may also be in a position to act as extenders of health care because of their continued focus on direct patient care in acute care as well as long term care settings. Whatever the role, it is clear that more research needs to be completed to understand ways to facilitate success for all LPN students, but especially those of Black descent. The literature suggested a multiplicity of variables for predicting academic performance of students while enrolled in associate, diploma, and baccalaureate nursing programs. Further, there were several variables and demographic characteristics identified as predictors of success on the licensing examination.

### **Purpose of the Study**

The purpose of this study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban post-secondary practical nursing program could predict students' performance on the NCLEX-PN.

### **Research Questions**

1. What proportion of the variance in NCLEX-PN performance is associated with a combination of academic and demographic variables?
2. What proportion of the variance in NCLEX-PN performance is associated with academic variables?
3. What proportion of the variance in NCLEX-PN performance is associated with demographic variables?
4. What set of variables provided the best prediction of the NCLEX-PN scores?

### **Significance of the Study**

There is a need to describe student characteristics and academic variables that may assist educators to predict the success of LPN students on the NCLEX-PN. The identification of these variables, singularly or in combination, will aid nurse educators to better meet student learning needs.

These needs may take the form of remediation, academic support services, counseling, or other forms of help. Common goals of these programs would be to increase the number of successful students in LPN programs, to increase the number of students successful on the NCLEX-PN, and to increase the number of graduates in the pool of available health care workers. By encompassing similar predictor variables as described with other nursing student populations, it was expected that this study would add to the research literature concerning LPNs. Further, it was expected that careful analysis of the available student variables would present a clearer picture of the relationships between and among success on the NCLEX-PN, total GPA, GPA for selected clinical and academic courses, and admission criteria (Wakelyn, 1988).

#### **Definition of Terms**

For purposes of this study the following operational definitions were used:

1. **Admission Criteria** - the list of requirements used by the LPN program administrators to make decisions for inclusion or exclusion of students.
2. **Licensed Practical/Vocational Nurse (LPN/LVN)** - a graduate of an approved program of nursing that prepared the graduate to participate in the licensing

examination. LVN is used in Texas and California (Kurzen, 1989). In this study LPN is used exclusively.

3. **National Council Licensure Examination for Practical Nursing (NCLEX-PN)** - a standardized written examination which measures knowledge required for providing safe care to patients. Each candidate must achieve a passing score in order to practice.
4. **National League for Nursing (NLN) Achievement Tests** - standardized written test developed to measure knowledge about specific content areas of nursing. These tests are usually administered at the end of a course to ascertain the student's level of knowledge and they are designed to provide comparative information about the student's knowledge in relation to other similar students who took the test in the content area covered (NLN Test Service, 1990).
5. **Practical Nursing Entrance Examination (PNEE)** - a written standardized test used by schools of practical nursing to measure academic abilities deemed necessary for success in the course of study. This test is thought to provide a means of comparing and evaluating applicants from diverse cultures and a uniform measure of academic performance for use in the admission process (Psychological Corporation, 1987).

### **Variables Included In Study**

There were **seven** independent (predictor) demographic characteristics, **five** independent (predictor) academic variables, and **one** dependent (criterion) variable - NCLEX-PN score.

The seven predictor demographic characteristics were:

1. Gender: male or female.
2. Age
3. Educational Background: High School Graduate or GED completion.
4. Prior nursing experience: no experience, nursing assistant, military training, volunteer.
5. Employment status during enrollment in the LPN program.
6. Martial status: single, married, widowed.
7. Number of children under 16 years of age.

The five academic predictor variables were:

1. Practical Nursing Entrance Examination (PNEE) scores.
2. National League for Nursing (NLN) Achievement Tests scores, which included the Three Unit Content scores (TUC): Anatomy and Physiology, Nursing Practice and Principles, and Nutrition.
3. National League for Nursing (NLN) Achievement Tests scores, which included: Mental Health, Medical/Surgical

nursing, Nursing of Children, Maternity Nursing, and Pharmacology.

4. Grade Point Average at the end of the pre-clinical experience. (GPAPC)
5. Grade Point Average at the completion of the LPN program. (GPAT)

The one dependent criterion was scores on the NCLEX-PN.

#### **Limitations of the Study**

1. The study population was delimited to graduates of one urban practical nursing school who completed the program and wrote the licensing board exam between 1982 and 1987.

2. The study results are delimited to the extent by which findings of this study are generalizable to other populations with similar characteristics.

#### **Summary**

Licensed Practical Nurses (LPNs) have made significant contributions to health care. It is anticipated this paraprofessional group will have vital roles in the delivery of direct nursing care for a variety of populations in the future. Their success in educational programs will be an influencing factor to ensure the availability of LPNs for future roles. As with other nursing education programs, it



is important that the student not only enrolls in a program but also completes the program and achieves success on the NCLEX-PN.

The research studies cited included associate degree, diploma, and baccalaureate students. These studies attempted to identify variables that predicted success for completing nursing education programs and for achieving passing scores on the NCLEX-RN. Among the variables cited were grade point average, scores on selected standardized tests, and demographic characteristics of the student. The research and professional literature does not address predictors of success with LPN student populations. The United States has been in a serious crisis with health care delivery. The availability of the LPNs provides alternatives for ensuring access to health care for all populations. In order to maintain an adequate pool of LPNs, it was important to gain an understanding of those variables that could predict success for the LPN student. This information may assist nurse educators to plan and implement programs to support student learning needs and may begin to fill the gap of knowledge about the minority LPN student.

## CHAPTER II

### REVIEW OF THE LITERATURE

The purpose of this study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban post-secondary practical nursing program could predict students' performance on the NCLEX-PN. This review of literature focused on information directly related to Licensed Practical Nurses (LPNs) as well as nurses prepared through other types of nursing education programs, e.g., associate degree programs, diploma programs, and baccalaureate degree programs. There was very little information in the research or in the professional literature concerning predictors of success on the licensing examination for LPNs graduates and even less information related to minority LPN students and graduates success on licensing examinations. However, this issue has remained a primary concern for the health care industry because the need for services from the LPN population will continue to increase. The concern of this researcher is that the available pool of providers has remained stagnant and in some cases the pool has decreased.

This literature review focused on research studies published since 1959. Topics reviewed for this chapter included: the continued need for LPNs; research studies

which considered the use of the National League for Nursing (NLN) achievement tests scores as a predictor for success on the NCLEX; academic predictors for success, i.e., grade point average (GPA), SAT scores, course grades, high School GPA, etc., and ethnic concerns regarding student success in LPN programs.

### **The Continued Need for Licensed Practical Nurses**

Among the recognized solutions for adequate interventions with health problems and problems of daily living is the need for health care providers with various knowledge and skills to achieve the goals identified in U.S. Department of Health and Human Resources, (1990a). The U.S. Census Bureau projected that by 1995 there will be over 34 million Americans aged 65 and over. In addition, there will be a significant increase in the number of frail elderly, those 75 years and older. These groups are expected to consume larger portions of health care services than any other age group. Yet, their health care needs are expected to be related to chronic conditions requiring long term care rather than acute care (U.S. Department of Health and Human Resources, (1990a)). These types of services may be provided in the community, nursing homes and/or other extended care, long term care, facilities. Long term care services that involve monitoring medications, compliance

with a prescribed regime, direct patient care, assistance with activities of daily living, and supportive services, may be provided by paraprofessionals such as LPNs. Wakelyn (1988) suggested that LPNs provide excellent nursing care and at a much lower cost than many other health care professionals. In addition to providing invaluable services to aging populations, clients experiencing chronic conditions, or clients who may need a variety of supportive services, could benefit from the work of LPNs. Preparation as an LPN provides career opportunities for persons who may not have considered this role as viable or achievable. Unless there are conscious attempts to encourage new students to pursue this career path, the national health care remains at risk.

### **Overview of Academic Preparation for Practical Nurse Students**

Clearly there will continue to be a need for LPNs, especially with the impending health care reform. In order to gain an understanding of the nature of the students, a brief overview of LPN education is presented. Licensed Practical Nurses have served all populations. In urban settings, this type of post high school education has been attractive to minorities, disadvantaged, and high risk populations because of convenience and cost and the

potential for upward mobility.

Practical Nursing education is usually offered in vocational or technical schools, community colleges, or hospitals. According to the National League for Nursing (1990a) the location of programs varies with the administrative control of schools within a region. For example, programs in the North Atlantic states and the South tend to be in vocational or technical institutions. Programs in the West are typically in community colleges. This is important because it sets an environment for learning and the conditions under which a student must learn. Academic programs are usually 12 to 18 months long and require heavy concentrated demands on the student's time and academic talents. Many programs volunteer to participate in external evaluation which leads to accreditation, thus recognition of the program for meeting universal standards. Because of the external review process, most programs have similar requirements for admission, progression, and graduation (National League for Nursing, 1990b). Typical information sought for the potential student may include: high school GPA, scores on pre-nursing entrance examinations, consideration of prior work and life experiences, individual motivation, and the demographic data which completes a profile of the student. All graduates of LPN programs are prepared to complete the

licensing examination after graduation. There was very little information in the literature concerning the nature of the LPN students, the factors that predict their success, or other research studies that could provide information about this population. Yet, similar data are available for students in other types of nursing programs. However, it is not known if the predictors of success for students in other nursing programs are true for LPN students. In order to elaborate on some predictors, the research literature describing a variety of nursing students was reviewed.

**Standardized Tests as Predictors of Success for Nursing  
Students in Diploma, Associate Degree and Baccalaureate  
Degree Programs**

One of the most commonly agreed upon predictors of success on the NCLEX has been National League for Nursing (NLN) achievement tests. Washburn (1980) found that NLN achievement test scores had a highly significant correlation with State Board Test Pool Examination, also referred to as NCLEX, results for students in diploma nursing programs. Papcum (1971), Muhlenkamp (1971) and Seither (1980) supported the use of the NLN achievement test to predict student performance on State Board Examinations.

National League for Nursing (NLN) Achievement Tests are standardized written tests developed to measure knowledge

about specific content areas of nursing. These tests are usually administered at the end of a course for the specific content taught. The tests are designed to provide comparative information about the student's ability in content areas covered (National League for Nursing, 1990b). They also provide information about the student's knowledge level and the student's ability to take standardized tests.

Baldwin, Mowbray, and Taylor (1968) summarized the value of the NLN Achievement Tests as predictors of success on the NCLEX-RN as follows:

The established relationships between NLN achievement examination scores and NCLEX scores opened the way for the use of a meaningful technique in the guidance of students, ... When a student can be informed with a measure of confidence that her interval estimate in a given subject, based on her score in the NLN achievement examinations, spans failing scores, she can scarcely be complacent about the inevitability of success. (p. 172).

This suggests that achievement tests can assist the nursing faculty to identify student weaknesses in nursing knowledge areas. Ferguson (1979) emphasized that successful test taking has been an important aspect of nursing education in that graduates must take the timed licensure examination

before becoming a registered nurse. The NLN tests may also provide the faculty with information about areas on which to focus in preparing students for the NCLEX, but more importantly for use while the student is progressing through the course of study.

The Entrance Examination for schools of Practical and Vocational Nursing (PNEE) is a standardized test measuring certain abilities needed to succeed in a practical nursing course of study. The PNEE provides a means of comparing and evaluating applicants from diverse educational backgrounds by offering a uniform measure of academic performance for use in the admission process (Psychological Corporation, 1987).

Shelley, Kannamer, and Raile (1976) used scores of NLN achievement test to predict performance on State Boards. The population for this study was 117 nursing students who graduated between 1968 and 1973. NLN achievement scores and NCLEX scores were correlated with course grades. There was a higher correlation between the NLN achievement test scores and the NCLEX ( $r = .32$ ) than between NLN achievement test scores and course grades. The results of this study indicated that NLN achievement test scores were a good indicator of potential success. It was recommended that the results be used in advising students regarding preparation for NCLEX-RN review.



Melcolm, Venn, and Bausell (1981) examined the relationship between NLN achievement test scores and results of NCLEX. The sample consisted of 390 records of baccalaureate graduates between 1976 and 1977. The predictors were NLN achievement scores, GPA, and individual grades from selected courses. The results of this study indicated that NLN Achievement test scores tended to correlate the highest with NCLEX scores ( $r = .53$ ). However, there were no significant correlations with any of the other predictors.

Breyer (1984) assessed the ability of scores from the 1982 edition of the Comprehensive Nursing Achievement Test to predict scores on the NCLEX-RN. Associate degree and diploma graduates completed the NCLEX-RN and their scores were paired with their results on the Comprehensive Nursing Achievement Test. Since this test was reported to assess basic knowledge across clinical areas of nursing it was also expected to predict performance on the NCLEX-RN. The findings were not significant and the researchers indicated the need for further study. However, there was a trend that suggested the comprehensive examination may predict success on the NCLEX-RN.

The Mosby Assess Test is similar to the NLN Comprehensive examination in terms of content covered. Wisenbaker (1985) investigated the relationship between

nursing students' scores on this test and their scores on the NCLEX-RN. One hundred seventy-two nursing students scores were considered for this study. The results of bivariate correlation using Pearson product moment correlation indicated a strong positive correlation between the Mosby Assess Test scores and the scores of the NCLEX-RN. The finding implied that this test could be used to assist students preparing for the licensing examination as well as to measure nursing knowledge gained throughout the program.

In summary, the research studies presented investigated the relationship between the NCLEX-RN and various standardized test scores. Although many of the studies were retrospective, the value of the findings could be in the development of new programs for nursing students preparing for the NCLEX. To that extent it seems clear that the use of only one measure would be inadequate. Programs for intervention must consider other predictor variables and intervention points must be flexible, progressive, dynamic, and clearly designed to meet the learning needs of the student. The nature of the learning process provides additional predictor variables for consideration. The research literature that follows describes academic variables that should be considered.

**Academic Variables as Predictors of Success for Nursing  
Students in Diploma, Associate Degree and Baccalaureate  
Programs**

Success for nursing students means that after completing the course of study, they also achieve a passing score on the licensing examination. Many studies used the NCLEX-RN as the measure of success because it is the common criteria for graduates of associates degree (AA), diploma, and baccalaureate degree (BSN) programs. There were many variables considered when attempting to make predictions about success on the licensing examination as well as completion of the required course of study. The reported research studies used associate degree, diploma, and baccalaureate students. Because this researcher believes the variables described by nursing students in general are similar characteristics of LPN student populations, the current literature was used to provide the foundation for understanding the issues and potential solutions.

Brandt, Hastie, and Schumann (1966) correlated nursing course grades and selected test scores with NCLEX-RN scores over a five year period. The sample consisted of 156 students who completed the curriculum requirements between 1962 and 1963. Data were gathered during the junior year. The findings indicated that grades received in nursing theory courses, scores on the National Science and Social

Science tests, and scores on the NLN basic medical-surgical achievement test were useful in predicting performance on the NCLEX-RN. There were no relationships found between nursing practice and the NCLEX-RN scores as measured by employer evaluations.

Miller, Feldhusan, and Asher (1968) calculated the correlation of twenty-two variables with the NCLEX-RN scores of 116 graduate nurses of an Associate Degree Program. The 22 predictor variables included: SAT scores, parents occupation, age, high school percentile rank, over all grade point average at the end of the nursing program, test anxiety, memory test for number of objects and first names, and grades, to mention a few. The over all grade point average at the end of the nursing program was one of the most effective predictors for success on the NCLEX-RN.

Stonsby (1959) reviewed a study completed by the National League for Nursing that investigated the relationship of specific admission criteria to success in an Associate Degree of Nursing Program (ADN) and to performance on the State Board Examination. The findings indicated that scores on the verbal section of the SAT and scores on the vocabulary and information sub-test of the Wechsler Adult Intelligence Scale (WAIS) were related to scores on the NCLEX-RN. Backman and Steindler (1971) supported these findings when they reported the use of the WAIS, the verbal

and math tests of the SAT, and high school rank as predictors of licensure examination scores.

Dubs (1975) reported that students' three year cumulative GPA and their nursing theory grades were the best predictors of success on NCLEX-RN. Employer ratings of students after graduation had a higher correlation with students' nursing practice grades than with nursing theory grades. This suggested that nursing practice grades may be a better predictor of actual performance in the work setting.

Quick, Krupa and Whitley (1985) studied the effectiveness of using student academic data available at the time of admission to a clinical nursing course in a baccalaureate program to predict performance on the NCLEX-RN. There were 182 students who received baccalaureate degrees from the school of nursing between 1982 and 1984. The variables considered were SAT scores, GPA at the end of the freshman year, and grades required in cognate courses. The cognate courses included lecture and laboratory components of the following courses: general chemistry, biochemistry, anatomy and physiology, and college algebra. All grades earned by a student were used in the data analysis. For example, if a student received a grade of "D" in a course, then repeated the course and earned a grade of "B", the "D" was included in the analysis. Results of the

data analysis indicated that students' scores on the verbal portion of the SAT and the lecture component of the Anatomy and Physiology course were related to NCLEX-RN performance.

In summary, the cited research demonstrates that consideration should be given to such academic variables as course grades in nursing theory as well as clinical experiences, test scores on NLN Achievement tests, and SAT scores. As they relate to this study, the following findings were the most important: Overall grade point average at the end of the nursing program was one of the most effective predictors for success on the NCLEX-RN; there was a relationship between verbal scores on the SAT and scores on the NCLEX-RN; and grades from selected support courses for nursing were related to NCLEX-RN performance. It was expected that these findings would support investigation of similar academic variables in LPN students.

### **Research Concerning Nursing Students Identified as "At-Risk" Populations**

Payne and Duffey (1986) attempted to determine whether graduates of a baccalaureate program who failed or who were within a chance level of failing the NCLEX-RN could have been identified as "risk" students during their undergraduate nursing program. These researchers were concerned to know if academic variables could be used to

identify students for whom special interventions were needed and at what point in their progression special interventions could have made a difference in their success on the NCLEX-RN. The subjects of this study were 144 graduates who completed training in the baccalaureate nursing program at the University of North Carolina, Chapel Hill between 1983 - 1984. The independent variables used were entrance grade point average (GPA), SAT scores (verbal and math), cumulative GPA for nursing courses, and cumulative GPA for all required courses. The dependent variable was the NCLEX-RN score. The major findings of this study indicated that the time of admission is not the optimal point to identify students who need assistance. Rather the optimal time seems to be following the first semester of professional study and more specifically at the mid-point and end-point of the junior year and mid-senior year. This finding suggests that various intervention strategies are needed throughout the student's academic experience.

Whitley and Chadwick (1986) investigated the unusual failure rate on the NCLEX-RN experienced by the 1983 graduates (N=176) of a Northwestern region baccalaureate nursing program. In addition to an examination of SAT scores, cumulative GPAs, and scores of nursing course examinations, these researchers examined conceptual and experiential areas of the curriculum. Results of this

investigation indicated that the following items tended to contribute to predictions of failure of high risks students: low SAT scores on admission, low cumulative GPAs in general and specifically in science grades, and scores below the mean on nursing course examinations. In this population the grade point averages of students tended to drift downward, from the admission GPA while in the nursing program. The relationship between conceptual and experiential content indicated a concern about whether the program met the needs of the average learners attracted to the program.

Woodham and Taube (1986) studied the relationship between selected admission criteria, performance in didactic nursing course content at an associate degree nursing program, and performance on the NCLEX-RN. The admission criteria of concern included age at graduation, high school percentile rank, and SAT scores (verbal and math). The didactic nursing course content was specific for the courses required in the program. There was a significant positive relationship between scores on the NCLEX-RN and grades in the didactic nursing courses. To satisfy the concern about the predictive value of the data, a multivariate design was used. The nursing course grades were weighted using an appropriate equation and were used to predict NCLEX-RN scores. The predicted scores correlated strongly ( $r = .78$ ,  $p < .001$ ) with the actual scores. These researchers



obtained results similar to others in that the value of retrospective research answered the question of concern a little late. However, the value of this approach lies in the development of programs that may prove useful for the "at risk" students.

McKinney, Small, O'Dell, and Coonrod (1988) attempted to define measures of academic success that predicted success on the NCLEX-RN. The records of 136 baccalaureate nursing students who graduated from a liberal arts college between 1983 and 1985 were the subjects for this study. The variables of concern were pre-entrance test scores, GPA, Mosby Assess Test scores, NCLEX-RN scores, Type A behavior, and demographic characteristics. Using a multiple regression formula, these researchers found that a combination of predictors of success could be available before graduation. The predictors that most accurately predicted scores on the NCLEX-RN included GPA, SAT verbal, Mosby Assess Test, and nursing theory GPA. There were implications for students who could have benefitted from review courses and/or remediation. Based on the data, the researchers concluded that nursing faculty could identify potential difficulty within the nursing major and the likelihood of NCLEX-RN failure at the completion of the sophomore and junior years.

Krupa, Quick, and Whitley (1988) investigated the

ability to predict grades in required nursing courses and success on the NCLEX-RN. The required nursing courses included Introduction to Nursing, Medical-Surgical I and II, Parent-Child Nursing, and Community Health. The population of this retrospective study was comprised of 338 graduates between 1982 - 1985 of a baccalaureate program. For purposes of this study the data were divided into two groups based on whether the subject passed or failed on the initial setting of the NCLEX. The data indicated that 74.5% of the subjects passed the NCLEX-RN on the first attempt. Further review of the data indicated that course grades in Introduction to Nursing, taken during the sophomore year, and Medical-Surgical nursing, taken during the junior year, were directly related to the NCLEX-RN performance. Grades earned in all other nursing theory courses had a positive correlation. Grades in the practicum courses were relatively poor predictors of NCLEX-RN performance.

Froman and Owen (1989) studied the use of correlation data in the path model to test the direct and indirect influences of selected student entry characteristics and achievement in liberal arts and nursing courses on NCLEX-RN performance. There were 72 baccalaureate graduates who completed the NCLEX-RN in 1982. All subjects attended the same university for a minimum of four semesters. Student age, SAT scores, and transfer status were considered entry

characteristics. Course achievement variables included three constructed GPAs: GPA-general, GPA-nursing, and GPA-clinical. Among the entry characteristics, only age developed paths to GPAs. The positive path coefficients from age to GPA-general and to GPA-nursing supported the hypothesis that age is a direct causal influence of these indices. The lack of influence of age on GPA-clinical was out of synchrony with the effect of age on the other GPAs. GPA-nursing had a significant path to NCLEX-RN. The results of this study suggested that age may be an important predictable variable for further study.

Jenks, Selekman, Bross and Paquet (1989) designed a study to identify predictors of success on the NCLEX-RN and to determine the optimal point in time for identifying students at risks for failure. These researchers attempted to gain some understanding about the best time to initiate interventions that could promote success for the high risk student. The sample of convenience (N=407) was 1984 - 1987 graduates of an upper-division baccalaureate program. The predictive value of the following variables were analyzed: Pre-matriculation profile which included, total lower division GPA, science GPA, type of lower division college, age, and sex; junior year nursing course grades; senior year nursing theory course grades; and the Mosby Assess Test. The results of analyzed data indicated that nursing theory

courses at the junior and senior year and the Mosby Assess Test strongly correlated ( $p.0001$ ) with NCLEX-RN performance. Discriminant analysis enabled successful classification of 62% of the sample at pre-matriculation, 81% at the end of the junior year, and 86% at the end of the senior year. This study supported the findings of other researchers who suggested there may be more than one point to consider when providing interventions to assist the student preparing for the NCLEX-RN.

Lengacher and Keller (1990) found that two nursing course grades and clinical course grades were the best predictors of successful performance on the NCLEX-RN. These researchers found that students at risk for failure can be identified upon admission and assistance should be given during the summer prior to the sophomore year .

Abdur-Rahman, Femea, and Gaines (1994) described the relationship of the Nurse Entrance Test (NET) scores and students' academic success within the first year of professional study. These researchers were concerned to identify predictors of academic success so that supportive academic programs could be implemented for "At-Risk" students. The analyzed data indicated that NET scores were predictive of nursing grades; successful students had significantly higher reading, math, and composite scores and lower family and social stress scores than unsuccessful

students. Although these data assisted in early identification of "At-Risk" students, there continues to be a need for developing strategies that are most effective for improving academic outcomes for this population.

In summary, the research literature described a variety of options for predicting success on the NCLEX-RN for "At-Risk" students. There was support for the use of multiple criteria rather than using single criteria when attempting to relate this population to predictors of success on the NCLEX examination. Standard scores, i.e., SAT, NLN Achievement Test or Mosby Assess Test, are most frequently cited as possible predictors. In addition, GPA, high school rank, and various combinations of grades in nursing programs have had some degree of success for predicting success, but retroactively. There were several periods of a student's progression plan identified as optimal for identifying problems and for implementing programs. Although the research is inconclusive in this area, the question remains concerning the most optimal time to intervene with "At-Risk" LPN students.

#### **Ethnic Concerns and Success on the NCLEX**

The research literature and professional literature has been very lacking with regard to predicting success for ethnic groups whether in a nursing program or completing the

NCLEX. Yet, with the shortage of nurses and the lack of ethnic representation in the profession, this should be a concern. Haney, Michael, and Martois (1976) examined the success of student nurses from three ethnic groups on NCLEX-RN using study behaviors, course GPA, and standardized achievement tests administered prior to nurses training. There were 223 white, 73 Mexican-Americans, and 67 Black first year students in a diploma program between 1974 and 1975. The study involved the determination of the relationship between each of the predictor variables and each of the criterion measures. Achievement tests proved to be the best predictor across groups.

Outtz (1979) examined the Grade Point Averages (GPAs) in college science courses of 110 Black baccalaureate nursing students who graduated between 1973 and 1977. All subjects were taking the NCLEX-RN for the first time after graduation. The results of this investigation indicated that the "cumulative GPA in college was the best predictor in all areas of the NCLEX-RN" (p.39). Outtz (1979) recommended counseling sessions for supportive work and test-wise sessions to assist the students with any test anxiety.

Tucker-Allen (1991) was concerned to ascertain how minority students of nursing felt about their educational experiences in a large urban setting. The Minority Student

Nurse Questionnaire (MSNQ) was used to solicit information from minority students enrolled at the time of administration of the MSNQ. The analysis of data indicated that Black students were more aware of differences between minority groups, that there was a need for academic assistance programs, and that non-minority students tended to be unfriendly. This experience of non-belonging coupled with other concerns fostered through previous life experiences of minority students and the need for academic assistance potentially creates an unsurmountable situation for any student.

Sutton and Claytor (1992) demonstrated that minority students could be successful in nursing education programs if there was a comprehensive retention program. This four phased program involved peer tutoring for students, individual and group sessions, academic skills workshops, newsletters, and increased dissemination of financial aid information. The measures used in the retention program were strongly supported by the institution. The results of the program included increased retention and graduation of minority students and in some instances these students achieved higher degrees.

White-Parson (1993) developed an accelerated curriculum for LPNs that allowed for upward mobility and completion of either an Associate Degree or a Baccalaureate Degree in

nursing. Students enrolled in a bridge course which "focused on identified nursing knowledge basic to associate degree nursing, the nursing content assessed in the NLN Mobility Profile I examination and nursing content found within the scope of practical nurse education" (p. 81 - 82). The curriculum combined content from the ADN track and the upper-level BSN track. Progression through the curriculum allowed for an accelerated option and a traditional option. The student could select an option based on the amount of time it would take to complete the program and personal considerations. This project reinforced the idea that LPN graduates could take on higher level course work. More importantly it demonstrated that LPNs who may have been previously identified as "At-Risk" could be successful in professional nursing programs with adequate support activities.

In summary, the studies cited indicated that "At-Risk" students can be successful if they have adequate support programs and activities. Emphasis needs to be given to development of strong retention programs and identification of weaknesses early in the student's progression plan. Information that could assist faculty to plan interventions that will facilitate student success on the NCLEX remains a great need for all nursing education programs. This is especially important for the LPN students. Clearly there



are multiple variables to be considered when attempting to predict success. The results of this study will provide new information to the literature concerning LPN students and minority students, especially African-Americans.

## **CHAPTER III**

### **RESEARCH DESIGN AND PROCEDURES OF THE STUDY**

The purpose of this study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban postsecondary practical nursing program could predict students' performance on the NCLEX-PN.

This chapter describes the research design, data collection procedures, test instruments, and treatment of data.

#### **Design of the Study**

The approach for this study was ex post facto research designed to determine relationships among variables (Polit and Hungler, 1987). Ex post facto research relies on naturally occurring values of the independent variable. The researcher cannot control the values of the independent variable as one does in experimental research. The independent variables for this study included demographic and academic variables of LPN program graduates.

#### **Population**

The population used in this study was two hundred sixty-one (261) graduates of a postsecondary practical nursing program who graduated and wrote the NCLEX-PN between 1982 and 1987. Even though the total accessible population

provided data for the present study, inferential tests were used to analyze findings in the regression analysis. This approach was taken on the assumption that this population is broadly representative of the larger population and setting of the postsecondary nursing program over time. The LPN program has been conducted in a career high school under the administrative authority of the Superintendent of Public Schools, and is located in a large urban area.

The criteria established for inclusion of student records in this study required that each graduate practical nurse had entered and completed the 13 month educational program and that the scores for all variables were available. The subject had to meet the basic requirements for admission to this practical nursing program. The admission criteria were that the student was 18 years of age or older, in good physical health, emotionally stable, and must have graduated from a high school or successfully completed the GED. The student must have achieved a satisfactory score on the pre-admission test, participated in a structured interview, and provided documentation of hospitalization insurance. The records of all students who graduated within the five year period as defined, met the criteria for data collection. The demographic profile of subjects used in this study is provided in Table 1.

The profile for this group of subjects is similar to

Table 1

**Demographic Characteristics of Practical Nurse Graduates Who Graduated and Wrote the Licensing Examination Between 1982 and 1987 - N = 261**

Demographic Characteristics of LPN Graduates		Percent of Responses	Actual Responses
Sex	Female	88.9	232
	Male	11.1	29
Age	Range 18-55 years		
	Mean = 31 years	100.0	61
Educational Background	High School Graduate	82.4	215
	GED	17.6	46
Prior Nursing Experience	No experience	53.6	140
	Nursing Assistant	44.8	117
	Military Training	1.1	3
	Volunteer	0.4	1
Employment Status	Employed	51.7	135
	Unemployed	48.3	126
Marital Status	Never Married	67.0	175
	Married	32.6	85
	Widowed	0.4	1
Number Children Under 16 years	None	59.4	155
	One	18.0	47
	Two	13.8	36
	Three	5.0	13
	Four-Five	3.8	10

those found in similar research studies. Nursing has been traditionally a female profession, thus it was expected that the number of male subjects would be small. A large percentage of the sample had no prior nursing experience, were unemployed, single, and had no children. These factors would be important in the planning of intervention programs as they would add additional personal and financial needs. Sixty-seven percent (175) of the population was Black. The remainder of the population was divided among white (4%) and other minorities. Because of the small numbers from ethnic groups other than Black, no attempt was made to analyze the data based in ethnicity.

#### **Test Instruments**

The Practical Nursing Entrance Examination (PNEE) is prepared and administered by The Psychological Corporation (1987). Completion of this examination is one of the requirements for admission to the Practical Nursing Program. This test measures general academic ability and scientific knowledge needed for success in the practical nursing education curriculum. The examination consists of five sections: verbal, numerical, life science, physical science, and reading. The subtests are scored separately because they are designed to measure relatively independent abilities. In addition, a total score is given which is the

individual's subtests raw scores. The total scores were used in this study. The NLN Achievement Tests consisted of two separate test groups: achievement test for basic foundational knowledge which uses the Three Unit Content (TUC) and knowledge for nursing practice which includes the five nursing specialty areas. The TUC examines student's knowledge of anatomy and physiology, nursing practices and principles, and nutrition. These tests are administered at the end of the first eighteen weeks and before the first clinical experience. The five content tests are administered at the completion of each of the areas taught: Mental Health, Medical/Surgical Nursing, Maternity Nursing, Nursing of Children, and Pharmacology. These tests are given to students to help in determining the students' strengths and weaknesses which may indicate the need for special interventions to help the students become successful in the program. The NLN achievement tests are not intended to determine pass/fail status or final grades, but rather to help users to evaluate the effectiveness with which they are meeting the objectives of similar educational programs as defined by representation of those programs throughout the country. The National League for Nursing (NLN) does not suggest acceptable scores.

#### **Data Collection Procedures**

The data for this study were student scores on the

NCLEX-PN, Practical Nursing Entrance Examination (PNEE) scores, and NLN Achievement Tests scores, including subtests related to specific content areas as well as demographic characteristics of the student population. Permission to conduct this study was obtained from the Director of Research and Evaluation and the Superintendent of Schools. (Appendix A and B) The research setting was the Division of Nursing of an urban postsecondary school in the Mid-Atlantic Region of the United States during Spring 1992. The data were retrieved from available records of all students who completed the LPN program and wrote the licensing examination between 1982 and 1987. Confidentiality was maintained by using a coding system created by the researcher. Names were not relevant to this study. Because of the nature of the study, a certificate of exemption of projects involving human subjects was obtained from the director, Division of Vocational and Technical Education, Virginia Tech. In addition, a conference was held with the school principal, the supervisor of the Health Occupations Students of America (HOSA), and the practical nursing coordinator for the school system to explain the purposes of this study, gain their support by explaining the purposes of the study, clarifying procedures necessary for data collection and offering to share the findings. This process also ensured that the researcher worked within the

guidelines of the school system for handling student records, provided an opportunity for responsible persons to ask questions about the study, and provided an opportunity to establish guidelines for accessibility to the student records.

The researcher scheduled four one-hour blocks of time, three days a week, 12 hours/week, between January and May 1992 to collect the data. The records of students who completed the practical nursing program between 1982 and 1987 were reviewed for this study. There were 261 records and all were used in this study. Student records that had documentation and scores for the Practical Nurse Entrance Examination (PNEE), the National League for Nursing Achievement Test (NLNAT), and the NCLEX-PN were tagged by the practical nursing department secretary. The researcher grouped the records according to graduation dates and began to review the records. Demographic characteristics for this study population were obtained from the application forms maintained in the student's records. Demographic characteristics studied by previous researchers were also of concern for this study: age, gender, educational level, employment status, previous nursing experience, marital status, and number of children under sixteen years of age. Academic variables were obtained from the final official transcript. Academic and test scores were: Practical



Nursing Entrance Examination score (**PNEE**), Grade Point Average at the end of Pre-clinical experience (the first 18 weeks [**GPAPC**]), Grade Point Average at the completion of the LPN program (**GPAT**); and Standardized Test Scores - Three Unit Content (**TUC**), Anatomy and Physiology, Nursing Practice and Principles, and Nutrition; and the NLN Achievement Tests scores for Mental Health, Medical/Surgical Nursing, Pharmacology, Maternity Nursing, and Nursing of Children. Standardized tests scores were maintained in the student's records on a faculty made standard summary form. Scores from the NCLEX-PN were obtained from a standard print-out prepared by the National Council of State Board of Nursing and was the outcome (dependent) variable. Confidentiality of records and information was maintained. All records used in the study were coded using an alpha-numeric system and names on records were not used for any reason.

#### **Treatment of Data**

The purpose of this ex post facto study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban postsecondary practical nursing program predicted student performance on the NCLEX-PN. The statistical technique used to analyze the data was multiple regression. This technique analyzes relationships between a dependent or criterion variable and an independent or predictor variable (Nie, et al, 1975) and

allows one to make tests of various hypotheses concerning the model. When two or more independent variables are used, the index of correlation is the multiple correlation coefficient, symbolized as  $R$ . The final  $R^2$  indicates the total amount of variance in the dependent variable accounted for by the included predictor variables. This technique obtains the best weighted combination of the predictor variables to predict the criterion variable. Multiple linear regression analysis was considered appropriate for this study because this approach was consistent with professional and research literature and this study used both dichotomous and continuous predictor variables. The data were analyzed using the Number Cruncher Statistical System (NCSS), an advanced statistical analysis software package. NCSS allows the researcher to perform a regular multiple regression with residual analysis, a variable subset selection (stepwise regression), a robust regression, or correlational analysis (Hintze, 1990). Additional analyses were completed to validate the initial findings. These analysis included: multi-collinearity, linear relationships, and shrinkage.

The NCLEX-PN examination provides evidence that graduates of LPN programs meet standard criteria and assures the public that the practitioner can provide care to patients at a safe level (Matassarini, 1989). In order to

investigate the extent to which relationships may exist between the selected independent variables and the dependent variable, the following research questions were posed:

1. What proportion of the variance in NCLEX-PN performance is associated with a combination of academic and demographic variables?
2. What proportion of the variance in NCLEX-PN performance is associated with academic variables?
3. What proportion of the variance in NCLEX-PN performance is associated with demographic variables?
4. What set of variables provide the best prediction of the NCLEX-PN scores?

#### **Summary**

The purpose of this ex post facto study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban postsecondary practical nursing program predicted student performance on the NCLEX-PN. The design of the study was described and the methods used to analyze the data was presented. The data collection procedures were described and the tests instruments used were presented.

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF THE DATA

The purpose of this study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban postsecondary practical nursing program could predict students' performance on the NCLEX-PN. Success on the NCLEX-PN means that students achieve a passing score. The NCLEX-PN examination provides evidence that graduates of LPN programs meet standard criteria concerning the basic knowledge necessary to perform duties and assures the public that the LPN practitioner is qualified to provide safe care to patients (Matassarini, 1989). This chapter presents the results of the data analysis and discussion of the research questions.

#### **Presentation and Analysis of the Data**

##### **Research question 1**

What proportion of the variance in NCLEX-PN performance is associated with a combination of academic and demographic variables?

Regression analysis of the demographic characteristics and the academic variables indicated that selected academic variables including PNEE; GPA Pre-Clinical; NLN Achievement Tests Scores: Mental Health, Pharmacology, Maternity, and Nursing of Children; and Grade Point Average at the end of program were significant when predicting success on the

NCLEX-PN. None of the demographic variables were significant.

Table 2 presents the multiple regression report of these variables. Approximately 71% of the variance in the NCLEX-PN can be explained by the total set of selected variables.

### Research question 2

What portion of the variance in NCLEX-PN performance is associated with the nine academic variables.

The multiple regression equation was run using the nine academic variables: Practical Nursing Entrance Examination, Grade Point Average Pre-clinical, NLN Three Unit Content Exam, NLN Test Mental Health, NLN Test Medical/Surgical, NLN Test Pharmacology, NLN Test Maternity Nursing, NLN Test Nursing of Children, and Grade Point Average at the end of program.

Analysis of the data indicated that 70% of the variance in the NCLEX-PN is associated with academic variables: PNEE; GPA Pre-Clinical; NLN Achievement Tests Scores: Mental Health; Maternity Nursing; Nursing of Children and Pharmacology; and Grade Point Average at the end of the program. The NLN Three Unit Content Exam and NLN Test Medical/Surgical nursing did not prove to be significant. Table 3 presents the multiple regression report for academic variables.

Table 2

Multiple Regression Report of Demographic Characteristics and Academic Variables  
on NCLEX-PN Scores, N= 261

Population Characteristics	Parameter Estimate	Standard Estimate	t-value	p-value	Simple R <sup>2</sup>	R <sup>2</sup>
<b>Demographic</b>						
Birth Date	.22	.0179	.39	.7001	.0183	
Sex	-9.31	-.0260	.65	.5144	.0023	
Status	-3.76	-.0100	-.25	.7992	.0085	
Number Minor of Children	1.61	.0167	.39	.6983	.0600	
Employment	5.06	.0225	.42	.6750	.0325	
Educational Background	14.98	.0507	1.28	.2013	.0071	
<b>Marital Status</b>						
Not Married	8.12	.0339	.12	.9026	.0141	
Married	17.79	.0741	.27	.7870	.0156	
<b>Prior Nursing Experience</b>						
None	-72.66	-.3218	-.92	.3567	.0699	
Nursing Assistant	-73.07	-.3227	-1.11	.2676	.0677	
Military Training	-121.26	-.1148	-1.58	.1149	.0001	

51

Table Continued on next page

Population Characteristics	Parameter Estimate	Standard Estimate	t-value	p-value	Simple R <sup>2</sup>	R <sup>2</sup>
<b>Academic Variables</b>						
Practical Nursing Entrance Examination	1.30	.2040	4.47	.0000*	.3463	
Grade Point Average Pre-Clinical	.46	-.1816	-2.35	.0190*	.0739	
NLN-Three Unit Content Examination	.22	.0532	.91	.3640	.3823	
NLN- Mental Health	.71	.1570	3.34	.0008*	.3828	
NLN- Med/Surg	.26	.0005	.01	.9909	.2756	
NLN-Pharmacology	.59	.1295	2.36	.0184*	.4096	
NLN-Maternity	1.08	.2384	4.60	.0000*	.4609	
NLN-Nursing of Children	.98	.2208	3.89	.0000*	.5155	
Grade Point Average at End of Program	.61	.2034	2.44	.0148*	.2042	.7114**

\* Significant at alpha .05

\*\* Variance in the dependent variable (NCLEX-PN) accounted for by the set of independent variables (demographic characteristics and academic variables)

Table 3

Multiple Regression Report: Academic Variables on NCLEX-PN Scores, N = 261

Academic Variables	Parameter Estimate	Standard Estimate	t-value	p-value	Simple R <sup>2</sup>	R <sup>2</sup>
Practical Nursing Entrance Examination	1.24	.1930	4.34	.0000*	.3463	
Grade Point Average Pre-Clinical	-.51	1.2022	-2.70	.0070*	.0739	
NLN-Three Unit Content Examination	.27	.0652	1.20	.2297	.3823	
NLN-Mental Health	.66	.1476	3.25	.0012*	.3828	
NLN-Med/Surg	.64	.0133	.29	.7738	.2756	
NLN-Maternity	1.17	.2588	5.27	.0000*	.4609	
NLN-Nursing of Children	1.00	.2255	4.14	.0000*	.5155	
NLN-Pharmacology	.49	.1088	2.08	.0377*	.4096	
Grade Point Average at End of Program	.65	.2146	2.65	.0082*	.2042	.7015**

\* Significant at alpha .05

\*\* Variance in the NCLEX-PN (dependent variable) accounted for by the set of academic variables.



### Research question 3

What proportion of the variance in NCLEX-PN performance is associated with demographic characteristics?

Thirteen percent of the variance in NCLEX-PN is associated with the total demographic characteristics.

Table 4 presents the multiple regression report for demographic variables for all subjects. Based on the data analysis, demographic variables as a set were not predictors of success on the NCLEX-PN. However, 6% of the variance was related to the number of children of the subjects.

### Research question 4

What set of variables provided the best prediction of the NCLEX-PN scores?

A stepwise regression procedure was used to determine the set of variables that best predicted the NCLEX-PN scores. All variables that had shown significance in previous regression analyses were entered into the stepwise regression equation.

Stepwise regression is a technique that displays how much each independent variable adds to the multiple R as it is entered into the equation. It was used in this study because it is a sequence of multiple linear regression equations that are computed in a stepwise manner. The variables that add the most to the equation remain and the other are eliminated by the computer. These are variables

Table 4

Multiple Regression Report: Demographic Characteristics on MCLEX-PN Scores, N = 261

Demographic Characteristics	Parameter Estimate	Standard Estimate	t-value	p-value	Simple R <sup>2</sup>	R <sup>2</sup>
Gender	- 9.31	-.0809	-1.25	.2101	.0023	
Status	- 3.76	.1079	1.59	.1115	.0085	
Number of Children	1.62	.2350	3.36	.0008*	.0600	
Employment	5.06	.0237	-.27	.7900	.0325	
Educational Background	14.99	-.0360	-.53	.5956	.0071	
Nursing Experience	- 2.28	.1693	.49	.6223	.0686	
<b>U1 Martial Status</b>						
Single	8.12	.3751	.80	.4231	.0141	
Married	17.79	.3071	.66	.5085	.0156	
<b>Nursing Experience</b>						
No Experience	- 72.66	-.4431	-.74	.4569	.0699	
Nursing Assistant	- 73.07	-.3531	-.72	.4719	.0677	
Military Training	-121.26	-.1357	-1.10	.2696	.0001	.1346**

\* Significant at alpha .05.

\*\* Variance in the MCLEX-PN (dependent variable) accounted for by the set of demographic characteristics.

that correlate highest with the dependent variable. All variables were entered as a group.

None of the demographic variables were significant predictors of the NCLEX score. The same statistics indicated that the Practical Nursing Entrance Examination (PNEE) score and four NLN achievement tests scores were significant when predicting success on the NCLEX-PN. Table 5 presents the stepwise regression report of the significant variables of all subjects. Approximately 69% of the variance in the NCLEX-PN was explained by five academic variables. Based on the analysis of data, the set of variables that provided the best prediction of NCLEX-PN performance was explained by scores on the Practical Nursing Entrance Examination (PNEE), and four NLN achievement tests: Mental Health Nursing, Pharmacology, Maternity Nursing, and Nursing of Children.

Multicollinearity occurs when two independent variables are highly intercorrelated. The Intercorrelation Matrix is displayed in Appendix C. Intercorrelations of .7 or higher were found between GPA-Clinical and GPA at the end of program; employed while in nursing program and nursing experience; and nursing experience and type of experience. In general, intercorrelation between demographic variables and between demographic variables and academic variables were at .3 or below. The intercorrelation between academic

Table 5

Stepwise Regression Report of Significant Academic Variables on NCLEX-PN Scores, N = 261

Academic Variables	Parameter Estimate	Standard Estimate	t-value	p-value	Sequential R <sup>2</sup>	Simple R <sup>2</sup>	R <sup>2</sup>
Practical Nursing Entrance Examination	1.42	.2209	5.30	.0000	.3463	.3463	
MLN-Mental Health Nursing	.79	.1733	3.38	.0001	.5070	.3828	
MLN- Pharmacology	.67	.1474	3.08	.0021	.5900	.4096	
MLN-Maternity Nursing	1.19	.2168	5.49	.0000	.6633	.4609	
MLN-Nursing of Children	1.12	.2521	4.72	.0000	.6903	.5155	.6903

variables were above .3.

The linear relationships in equations are established when each independent variable is plotted with the dependent variable. In this study all independent variables showed linear relationships.

Shrinkage means air is in the equation. For this reason adjusted  $R^2$  is reported and not just  $R^2$ . The adjusted  $R^2$  will always be smaller. The adjusted  $R^2$  is reported in the tables.

The NLN Three Unit Content test was not a significant predictor of success on NCLEX-PN. A reason for this may be that the Three Unit Content is made up of Nursing Practices and Principles, Anatomy and Nutrition. These courses are mainly theory courses taught in the classroom and clinical application is limited.

In summary, for the population studied, the Practical Nursing Entrance Examination and the NLN achievement tests in clinical areas of Mental Health, Nursing of Children, Maternity Nursing, and Pharmacology were predictors of success on the NCLEX-PN. Grade point averages for pre-clinical content and the total grade point average at the end of the LPN program were also predictors of success for graduates of this program.

## **CHAPTER V**

### **SUMMARY, CONCLUSIONS, DISCUSSION, AND IMPLICATIONS AND RECOMMENDATIONS**

In the preceding chapters attention was given to the research questions, the background, the review of the literature, the design and methodology used and the findings for this research study. This chapter will summarize the first four chapters, report the conclusions and make recommendations for use of the findings and for future research.

#### **Summary**

The purpose of this study was to assess the extent to which selected demographic characteristics and academic variables of graduates from an urban postsecondary practical nursing program could predict students' performance on the NCLEX-PN. There were seven independent (predictor) demographic characteristics, five independent (predictor) academic variables, and one dependent (criterion) variable used in this study. The demographic characteristics were: age, sex, educational background, prior nursing experience, employment status during enrollment in the LPN program, marital status, and the number of minor children. The five academic predictor variables were the Practical Nursing Entrance Examination (PNEE) scores, the National League for

Nursing (NLN) Achievement Tests scores concerned with prerequisite content which included: the Three Unit Content scores (TUC); NLN Achievement Tests scores related to nursing content: Mental Health Nursing, Medical/Surgical Nursing, Nursing of Children, Maternity Nursing, and Pharmacology; Grade Point Average at the end of the pre-clinical experience (GPAC); Grade Point Average at the completion of the LPN program (GPAT). The one dependent variable was scores from the NCELEX-PN for the population studied.

Data were extracted from the permanent records of graduate nurses of an urban postsecondary LPN program, who met the criteria for inclusion. The data were analyzed using a computer program for regression analysis. There were four research questions for this study: 1. What proportion of the variance in the NCLEX-PN performance is associated with a combination of academic and demographic variables? 2. What proportion of the variance in NCLEX-PN performance is associated with academic variables. 3. What proportion of the variance in NCLEX-PN performance is associated with demographic variables? and 4. What set of variables provides the best prediction of NCLEX-PN scores?

Research and other professional literature concerned with describing predictor variables for success in nursing programs studied associate degree, diploma, and

baccalaureate students. These sources of literature served as a basis for this study because of the scarcity of literature about LPN students.

The review of literature suggested that NLN Achievement Tests are significant predictor variables. It was further suggested that grades received in basic science courses and nursing theory courses may have value in predicting success on the NCLEX-RN. There were no relationships found between nursing practice and the NCLEX-RN scores as measures by employer evaluations (Brandt, et al., 1966). Miller et al. (1968) found that the overall grade point average at the end of the nursing program was one of the more effective predictors of success on the NCLEX-RN. Dubs(1975) reported that students' three year cumulative GPA and their nursing theory grades were the best predictors of success on the NCLEX-RN. The review of the research also suggested that a linear regression analysis and devising of regression equations could aid in identifying significant predictor variables for a given sample. The studies in the review of the literature also suggested that the data obtained could be used by faculty in a given nursing program to ensure adequate counseling and guidance of students as they progress in their nursing educational program; evaluate, review and update curriculum content and plan for clinical



experiences; and aid students in reviewing for the NCLEX-PN.

In order to gather data pertaining to the questions researched in this study, a population of graduate nurses from an urban postsecondary practical nursing program who graduated and wrote the NCLEX-PN examination between 1982 and 1987 was used. The criteria for data collection for the population were that each graduate nurse entered and completed the practical nursing program at the given school and had data available for the seven predictor demographic characteristics, the five academic variables and the NCLEX-PN score. The population used in this ex post facto study consisted of 261 graduates of a postsecondary practical nursing program.

Data of concern were extracted from the permanent records of the graduate nurses who met the criteria for this study. The data were analyzed using the Number Cruncher Statistical System (NCSS) which allowed the researcher to perform multiple regression computations with residual analysis, a variable subset selection (stepwise regression), a robust regression, or correlational analysis.

The findings from the analysis of the data relating to the research questions investigated are:

Research question 1 - What proportion of the variance in NCLEX-PN performance is associated with a combination of

academic and demographic variables? A moderate to large proportion of the variance in NCLEX-PN performance could be explained by a combination of academic and demographic variables,  $R^2 = .7114$ . Approximately 71% of the variance in the NCLEX-PN can be explained by the total set of selected variables. Within the total set, none of the demographic variables was statistically significant.

Research question 2 - What proportion of the variance in NCLEX-PN performance is associated with academic variables? Seventy percent of the variance in the NCLEX-PN was associated with the following academic variables: Practical Nursing Entrance Examination (PNEE); Grade Point Average at the end of Pre-clinical experience; NLN Achievement Tests Scores: Mental Health Nursing, Maternity Nursing, Nursing of Children; and Grade Point Average at the end of the program.

Research question 3 - What proportion of the variance in NCLEX-PN performance is associated with demographic characteristics? Only 13% of the variance in NCLEX-PN was associated with the total set of demographic variables. This result implies that demographic variables as a set were not predictors of success on the NCLEX-PN.

Research question 4 - What set of variables provided the best prediction of the NCLEX-PN scores? The variables that provided the best prediction of the NCLEX-PN score were

the Practical Nursing Entrance Examination scores, NLN Achievement Tests scores in Maternity Nursing, Nursing of Children, Mental Health Nursing and Pharmacology. Overall these five variables accounted for 69% of the variance in the NCLEX-PN performance.

Based on the findings of this study, faculty in LPN programs may consider the use of Practical Nursing Entrance Examinations scores and NLN Achievement Tests scores as a place to start making decisions about predicting success in the nursing program and on the NCLEX-PN.

#### **Conclusions of the study**

Based on the findings for the population studied, the following conclusions were made:

1. Demographic characteristics are not reliable predictors of NCLEX-PN success.
2. Selected academic variables are predictors of success on the NCLEX-PN. These variables are the Practical Nursing Entrance Examination (PNEE); Grade Point Average Pre-clinical; NLN Achievement Tests Scores: Mental Health, Maternity Nursing; Nursing of Children and Pharmacology; and Grade Point Average at the end of the nursing program.
3. A battery of significant positive predictor variables can be readily constructed from a given nursing curriculum to predict potential success on the NCLEX/PN.

### **Discussion of the findings**

There remain many unanswered questions about predictors of success on the NCLEX-PN. Faculty will continue to need this type of information to make LPN programs more desirable as a career option and as a means of upward mobility for future populations of LPN students. Is it the nature of these examinations in general or the nature of the content of these tests that have some relationship to students success on the NCLEX? This aspect of the NLN tests has not been studied.

The findings of this study were similar to other research studies conducted using baccalaureate, associate degree and diploma graduates in that selected academic variables were predictors of success on the NCLEX-PN. Perhaps the most notable result of this study was that a combination of scores from several individual academic variables were significant predictors of success. Practical Nursing Entrance Examination scores; Pre-clinical Grade Point Average; scores on the NLN Achievement Tests in the areas of Mental Health, Maternity Nursing, Nursing of Children, and Pharmacology; and the total Grade Point Average upon program completion were the combined academic variables that predicted success on the NCLEX-PN for this population.

Practical Nursing Entrance Examination scores were

found to be useful for predicting success on the NCLEX-RN. Several researchers including Horns, O'Sullivan & Goodman, 1991; McKinney, Small, O'Dell & Coonrod, 1988; Leitsch, 1988; Miller, Feldhusen & Asher, 1968; Backman & Steindler, 1971; Quick, Krupa & Whitley, 1985; Payne & Duyffey, 1986; Whitley & Chadwick, 1986; and Woodham & Taube, 1986 described the use of the Practical Nursing Entrance Examination as predictor of success on the NCLEX.

Grade point averages at various points in the progression of the student were used by several researchers to predict success on the NCLEX-RN and to determine the need for interventions to assist students in the academic program and predict success on the NCLEX-RN. Pre-clinical grade point averages were described by Horns, O'Sullivan & Goodman, 1991; McKinney, Small, O'Dell, & Coonrod, 1988; Crane, Wright & Michael, 1987; Dubs, 1965, Quick, Krupa and Whitley, 1985; Jenks, Selekman, Bross, & Paquet, 1989; and Lengacher & Keller, 1990 as predictors of the success on the NCLEX. However, because these scores are generated almost four years before the student actually takes the NCLEX, their value is questionable. None of the researchers identified grade point averages as a lone predictor of success on the NCLEX.

National League for Nursing test scores have been used by all levels of nursing education programs to evaluate

student knowledge at various progression points of the nursing programs. Faculties have used these same scores as indicators of success on the NCLEX-RN. Examinations developed by the NLN are accepted throughout the nursing profession as universal criteria for decision-making. Achievement test scores were found to be significant predictors of success on the NCLEX as well as measures of clinical nursing knowledge for specific content areas. Many researchers found NLN tests to be useful predictors of success on the NCLEX (Horns, O'Sullivan & Goodman, 1991; Crane, Wright & Michael, 1987; Washburn, 1980; Papcum, 1971; Muhlenkamp, 1971; Seither, 1980; Baldwin, Mowbray & Taylor, 1968; Shelley, Kannamer & Raile, 1984; and Wisenbaker, 1985).

Among some of the interesting findings of these research studies were such events as the repeated appearance of NLN scores on the Mental Health Nursing and Nursing of Children tests. These were included in this study and were found to be significant predictors of success on the NCLEX-PN. Scores on the NLN Pharmacology examination were also included in the tests that predicted success. The NLN Three Unit Content tests were not significant predictors in this study. Neither were they mentioned in the literature as significant indicators of success or failure in NCLEX-PN performance. This may be related to the limited use of

these particular tests in programs that required indepth study of the content areas covered by the examination. The Three Unit Content includes Nursing Practice and Principles, Anatomy, and Nutrition. These content areas are not the focus of the NCLEX, but are integrated in the content of the examination.

Demographic characteristics did not influence variability of scores for the population studied. In this study the entire group of demographic characteristics accounted for 13% of the variance in the NCLEX-PN. However, the only characteristic that was statistically significant was the Number of Children. It is difficult to explain this finding in this study. Two possible explanations could be first that students with children have been exposed to a broader range of life experiences that tend to increase knowledge and thus higher scores on the NCLEX-PN. The second possible explanation is that students with families are better able to organize their thoughts and realize the significance of the economic gain to be derived from passing the NCLEX-PN. The number of children has not been reported in the literature as a significant factor when predicting success on the NCLEX for any nursing education level.

The findings from this study could provide students and faculty a starting point for improving the quality and quantity of nursing content curriculum. The established

relationships between NLN Achievement Tests scores and NCLEX-PN scores, in this study and in the review of the literature, should indicate to the faculty and students the value of these evaluative tools.

### **Implications and Recommendations**

Based on the data analysis, experiences of this researcher, and the review of the literature, the findings and conclusions have significant implications for nurse educators and students of practical nursing educational programs. Even though this population was made up of "At-Risk" minority students, mainly Blacks and other minorities and educated in an inner city school, they did well on the NCLEX-PN examination and did achieve their goal.

1. A battery of significant predictor variables can be constructed from a given nursing curriculum to predict potential success on the NCLEX-PN; therefore, the faculty should evaluate their intervention strategies and revise them to provide those strategies that are of the most benefit to the current students.
2. Although NLN Achievement Tests scores do not enter into course grades, the tests results should be used by faculty and students when formulating a planned program and providing counseling and guidance.
3. Counselors and prospective nursing students should be



made cognizant of the results of this study.

4. A comprehensive retention program should be initiated that consists of peer tutoring for students, individual and group sessions, and academic skills workshops to increase retention and graduation of minority students.

5. Remedial courses should be provided for those nursing students having low grade point averages and NLN Achievement Test scores.

6. Since academic success does not measure on-the-job performance, research to determine the relationship between NCLEX-PN and job performance should be conducted.

7. This study should be repeated within the given school to determine if the significant predictors found in this study remain constant or change over time in the given school.

8. A similar study of this nature should be conducted with a similar population in a different school setting to compare the results.

For schools of practical nursing, success on the NCLEX-PN is one of the long range goals for student practical nurses. Since licensure is required by most states, schools of practical nursing strive to have 100% of their graduates achieve success on the licensure examination. If certain demographic characteristics and academic variables indicate likelihood of success on the NCLEX-PN, the practical nursing school faculty should use these predictors as evaluative

tools to identify marginal students. Early identification of marginal students would allow for advisement of students in such a way that they could participate in programs to strengthen their area of weakness in the nursing curriculum and achieve success on the NCLEX-PN. This approach would reduce high failure rates on the NCLEX-PN among graduates and strengthen students while in the program.

## REFERENCES

- Abdur-Rahman, V., Femea, P., & Gaines, C. (1994). The nurse entrance test (NET): An early predictor of academic success. The Association of Black Nursing Faculty Journal, 5, (1), 10-14.
- Backman, M. & Steindler, F. (1971). Let's examine: Prediction of achievement in a collegiate nursing and performance on state board examinations. Nursing Outlook, 19, (7), 487.
- Baldwin, J., Mowbray, J., & Taylor, R. (1968). Factors influencing performance on state board test pool examination. Nursing Research, 17, 170-172.
- Brandt, E., Hastie, B., & Schumann, D. (1966). Predicting success on state board examinations. Nursing Research, 15, (1), 620.
- Breyer, F. (1984). The comprehensive nursing achievement test as a predictor of performance on the NCLEX-RN. Nursing and Health Care, 4, 193-195.
- Crane, P, Wright, C., & Michael, W. (1987). School related variables as predictors of achievement on the national council licensure examination (NCLEX-RN) for a sample of 418 students enrolled in a diploma nursing program. Educational and Psychological Measurement, 47, 1055-1069.
- Dubs, R. (1975). Comparison of student achievement with performance ratings of graduates and state board examination scores. Nursing Research, 24, (1) 59-64.
- Ferguson, C.K. (1979). Reading skills versus success in nursing school. Journal of Nursing Education, 18, 4-12.
- Froman, R. & Owens, S. (1989). Predicting performance on the national council licensure examination; Western Journal of Nursing Research, 11, (3), 334-346.

- Haney, R., Michael, W., & Martois, J. (1976). The prediction of success of three ethnic groups in the academic components of a nursing training program at a large metropolitan hospital. Educational and Psychological Measurement, 36, 421-431.
- Hintze, J. L. (1990). Number Cruncher Statistical System. Version 5.01, Reference Manual, Kaysville, Utah: Author.
- Horns, P., O'Sullivan, P., & Goodman, R. (1991). The use of progressive indicators and predictors of NCLEX-RN success and performance of BSN graduates. Journal of Nursing Education, 30(1), 9-14.
- Jenks, J., Selekman, J., Bross, T., & Paquet, M. (1989). Success in NCLEX-RN: Identifying predictors and optimal training for intervention. Journal of Nursing Education, 28, (3), 112-118.
- Krupa, K., Quick, M., & Whitley, T. (1988). The effectiveness of nursing grades in predicting performance on the NCLEX-RN. Journal of Professional Nursing, 4, (4) 294-298.
- Kruzen, C. (1989). Contemporary practical and vocational nursing. Philadelphia: J. B. Lippincott.
- Leitsch, P. (1988). Relationship between selected academic and demographic variables and success in licensed practical nursing program. (TABE). Illinois: Southern University at Carbondale.
- Lengacher, C. & Keller, R. (1990). Academic predictors of success on the NCLEX-RN examination for associate degree nursing students. Journal of Nursing Education, 29, (4) 163-169.
- Matassarini, J. E. (1989). The nursing licensure process and the NCLEX-RN. Nurse Educator, 4, (6) 32-35.
- McKinney, J., Small, S., O'Dell, W., & Coonrod, B. (1988). Identification of predictors of success for the NCLEX - and students at risk for NCLEX failure in a baccalaureate nursing program. Journal of Professional Nursing, 4, (1) 55-58.

- Melcolm, N., Venn, R., & Bausell, R. (1981). The prediction of state board test pool examination scores within an integrated curriculum. Journal of Nursing Education, 20, 26-28.
- Miller, C., Feldhausan, J., & Asher, J. (1968). The prediction of state board examination scores of graduates of an associate degree program. Nursing Research, 17, (6), 555-558.
- Muhlenkamp, A. (1971). Prediction of state board scores in a baccalaureate program. Nursing Outlook, 19, (1), 57.
- National League for Nursing, Division of Research. (1990a). Nursing Data Resource, Vol IV, Vol IV. Report of Practical/Vocational Nursing Data. Publication No. 19-2338. New York: Author.
- National League for Nursing, Division of Research. (1990b). The silent few: Men and minorities in nursing education. Publication No. 19-2337. New York: Author.
- National League for Nursing Test Service. (1990). Guide for the interpretation of NLN test reports. NLN Publication No. 17-1932. New York: Author.
- Nie, N. H., Hull, C., Hadlai, S., Jankins, J., Steinbrenner, K., & Bent, D. (1975). Statistical package for the Social Sciences, 2nd ed. New York: McGraw-Hill.
- Outtz, J. (1979). Predicting the success on state board examinations for blacks, Journal of Nursing Education, 18, (4) 35 - 40.
- Papcum, I. (1971). Let's examine: Results of achievement tests and state board tests in an associate degree program. Nursing Outlook, 19, (5) 341.
- Payne, M. & Duffey, M. (1986). An investigation of the predictability of NCLEX scores of BAN graduates using academic predictors. Journal of Professional Nursing, 2, (5) 326-332.
- Polit, D. & Hungler, B. (1987). Nursing Research: Principles and Methods (3rd ed). Philadelphia: J.B. Lippincott Co.

- Psychological Corporation Harcourt Brace Jovanovich, Inc. (1987). Entrance examination for schools of practical/vocational nursing: A guide for admissions officers. San Antonio, Tx: Author
- Quick, M., Krupa, K., & Whitley, T. (1985). Using admission data to predict success on the NCLEX-RN in a baccalaureate program. Journal of Professional Nursing, 1, (6), 364-368.
- Rosenfeld, P. (1990). Perspectives in Nursing 1989-1991. The Many Faces of the Newly Licensed Nurse. Publication No. 41-2281:23-32. New York: National League for Nursing.
- Ross, C. (1981). Personal and vocational relationships in practical nursing, 5th ed. Philadelphia: J.B. Lippincott, Co.
- Seither, F. (1980). Prediction of achievement in baccalaureate nursing education. Journal of Nursing Education, 19, (March) 28-36.
- Shelley, B., Kennamer, D., & Raile, M. (1976). Correlation of NLN achievement test scores with state board test pool examination scores. Nursing Outlook, 24, (1), 52-55.
- Stonsby, E. (1959). An 8 year plan for nursing education. Nursing Outlook, 7, 596-598.
- Sutton, L., & Claytor, K. (1992). Enhancing minority nursing students success through a comprehensive retention program. The Association of Black Nursing Faculty Journal, 3, (2), 31-37.
- Tucker-Allen, S. (1991). Minority student nurses' perceptions of their educational program. The Association of Black Nursing Faculty Journal, 2, (3), 59-63.
- U.S. Department of Health and Human Services. Public Health Service. (1990a). Healthy People 2000: National health promotion and disease prevention objectives. (DHHS Publication No. PHS 91-50213) Washington, D.C. : US Government Printing Office.

U.S. Department of Health and Human Services. Public Health Service, (1990b). Minorities and Women In the Health Fields. Health Resource and Service Administration, Bureau of Health Professionals, HRSA-P-DV, 90-3.

Wakelyn, J. (1988). The education of practical nurses: A growing concern. (Position paper No. 1) Richmond, Va: The Health Occupations Educational Service.

Washburn, G. (1980). Relationships of Achievement Test Scores and State Board Performance in a Diploma Nursing Program. ERIC ED 203752.

White-Parson, W. (1993). LPN to ADN/BSN: Accelerated curriculum for LPN's. The Association of Black Nursing Faculty Journal, 4, (4), 80-84.

Whitley, M. & Chadwick, P. (1986). Baccalaureate education and NCLEX: The causes of success. Journal of Nursing Education, 25, (3) 94-101.

Wisembaker, S., Lee, M. (1985). A pilot Study of the Use of the Assess Test to Predict Success on the National Council Licensure Examination. ERIC ED 265196.

Woodham, R. & Taube, K. (1986). Relationship of nursing program predictors and success on the NCLEX-RN examination for licensure in a selected associate degree program. Journal of Nursing Education, 25, (3), 112-117.

**APPENDIX A**



# VIRGINIA TECH

Division of Vocational &  
Technical Education

College of Education  
Blacksburg, Virginia 24061-025

3306 4th Street, S.E.  
Washington, DC 20032

September 27, 1991

Dr. Franklin L. Smith  
Superintendent of the District  
of Columbia Public School System  
415 12th Street, N.W., Suite 1205  
Washington, Dc 20004

Dear Dr. Smith:

I was employed as a Practical Nursing Educator from 1982 to 1988 at Margaret Murray Washington Career Center, in the District of Columbia Public School System. I am a doctoral candidate at Virginia Polytechnic Institute and State University in Blacksburg, Virginia. I left the area in 1988 to relocate to Blacksburg, Virginia to do my residency requirement for my program of study. Upon returning to the area in 1991, I substituted as a Practical Nursing Educator, at the Margaret Murray Washington Career Center until the end of the school year. I currently volunteer as a tutor to the students as needed especially in the areas of math and pharmacology. Currently, I am employed as a nursing instructor at Bowie State University, Bowie Maryland.

I wish to do my dissertation on the variables that may influence the practical nurse students success in the academic settings, e.g., admission criteria and grade point average in the nursing program, and to ascertain if there is a relationship between the variables of concern and the students success on the NCLEX-PN.

Permission is requested to review and obtain pertinent data on the graduates for years 1982-1987 from the records of the Practical Nursing Program Graduates at Margaret Murray Washington Career Center. The results of this study will be shared with the District of Columbia Public School System personnel to further assist them in providing this very viable career option to the individuals interested as well as meet the needs created by the national nursing shortage. All data collected and used in this study will be kept confidential and used for aggregate study only. I am enclosing an attached copy of my proposal. It is my understanding that I need to contact the following persons:

Dr. Zollie Stevenson, Jr.  
Director of Research and Evaluation Branch

Mrs. Shirley M. Mines, RN, MS  
Supervising Director of Health Occupations

Thank you for all considerations shown me in my request. If you have any questions please feel free to contact me at (301) 464-7273 or at home (202) 562-5431. Awaiting your earliest response.

Sincerely Yours,

*Ruth B. Young Richardson*

Ruth B. Young Richardson, RN, MA

Enclosures

**APPENDIX B**



DISTRICT OF COLUMBIA  
PUBLIC SCHOOLS

*Office of the Deputy Superintendent*  
*Educational Programs and Operations*

415 12th Street, N. W., Room 900  
Washington, D. C. 20004  
(202) 724-3636  
FAX (202) 727-4972

October 16, 1991

Ms. Ruth B. Young Richardson  
3306 4th Street, S.E.  
Washington, DC 20032

Dear Ms. Young Richardson:

Your September 27, 1991 letter to Dr. Franklin L. Smith, Superintendent of Schools, requesting approval to collect data for a dissertation study has been referred to me by Dr. Marilyn Tyler Brown, Associate Superintendent for Student Services. Your study will focus on variables that may influence performance of practical nursing students on the NCLEX-PN exam.

Staff in the Research and Evaluation Branch have reviewed your dissertation proposal and are pleased to approve the study. Ms. Alethia Spraggins, Principal, M.M. Washington Career Development Center, has agreed to allow access to student records.

Approval to release information collected on DCPS students for publication must be approved in advance by the DCPS Legal Counsel Director, Research and Evaluation Branch. Please provide the Research and Evaluation Branch with a copy of the completed dissertation study.

You may contact me at (202) 724-8751 or 724-3636 if you have any questions.

Sincerely,

Zollie Stevenson, Jr., Ph.D.  
Director  
Research and Evaluation Branch

cc: Dr. Doris A. Woodson  
Ms. Cecelia E. Wirtz  
Dr. Marilyn Tyler Brown  
Ms. Alethia Spraggins

**APPENDIX C**

**Intercorrelation Matrix.**

GENDER	1.0000	STATUS	0.2895	NO. CHDN	-0.0790	MARITAL	0.0339	EMPLOYED	0.1708	ED. BACKG	-0.0356	NURS-EXP	0.1114	TYPE-EXP	0.1121	ENTRC-SC	0.1171	GPA-CLIN	-0.0161	NLN-3CNT	0.1774	MENT-HLT	-0.0779
STATUS	0.2895	1.0000		-0.0573	0.0089	0.0089	0.1139	0.0140	0.1782	0.1508	0.1389	0.1348	0.0094	0.0094	0.0244	0.0244	0.0244	0.0244	0.0244	0.0244	0.0244	0.0244	0.0244
NO. CHDN	-0.0790	-0.0573	1.0000		0.4270	1.0000	0.3038	1.0000	0.2373	1.0000	0.2556	1.0000	0.9408	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382
MARITAL	0.0339	0.0089	0.4270	1.0000		0.3038	1.0000	0.2373	1.0000	0.2556	1.0000	0.9408	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000
EMPLOYED	0.1708	0.1139	0.3038	1.0000	0.2373	1.0000		0.2373	1.0000	0.2556	1.0000	0.9408	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000
ED. BACKG	-0.0356	0.0140	0.2656	0.2373	1.0000	0.2556	1.0000		0.2373	1.0000	0.2556	1.0000	0.9408	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382
NURS-EXP	0.1114	0.1782	0.1508	0.9408	0.9408	1.0000	0.2373	1.0000	0.2373	1.0000	0.2556	1.0000	0.9408	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382
TYPE-EXP	0.1121	0.0094	0.0094	0.0244	0.0244	0.0244	0.0244	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382	1.0000	0.2382
ENTRC-SC	0.1171	0.1458	0.1458	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617
GPA-CLIN	-0.0161	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617	0.0617
NLN-3CNT	0.1774	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837	0.1837
MENT-HLT	-0.0779	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859	0.0859
MED/SURG	-0.0142	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637	0.0637
PHARM	0.0560	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644	0.1644
MATERNITY	-0.1163	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924	0.0924
NURS.CH	-0.0170	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891	0.0891
GPA-E.PR	-0.0777	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945	0.0945
NCLX-SC	-0.0476	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922	0.0922
NCLX-P/F	-0.0712	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574	0.0574
RACE	0.1435	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912	-0.0912
B-DATE	0.0309	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274	0.0274

Intercorrelation Matrix (Continued)

	MED/SURG	PHARM	MATERNITY	NURS.CH	GPA-E-PR	NCLEX-SC	NCLX-P/F	RACE	B-DATE
GENDER	-0.0142	0.0560	-0.1163	-0.0170	-0.0777	-0.0476	-0.0712	0.1435	0.0309
STATUS	0.0637	0.1644	0.0924	0.0891	0.0945	0.0922	0.0574	-0.0912	0.0274
NO.CHDN	0.1272	0.1415	0.2148	0.2400	0.0343	0.2450	0.1876	0.1284	-0.3465
MARITAL	0.1170	0.0758	0.0650	0.1001	0.0266	0.1112	0.0701	0.1771	-0.5118
EMPLOYED	0.1306	0.1201	0.1156	0.2055	-0.0353	0.1803	0.1005	0.1325	-0.3589
ED.BACKG	0.0647	0.0145	0.0104	0.0462	-0.0674	0.0843	0.0817	0.1454	-0.4113
NURS-EXP	0.1920	0.2935	0.1597	0.2948	0.0668	0.2620	0.1718	0.1344	-0.3504
TYPE-EXP	0.1847	0.2913	0.1603	0.2663	0.0926	0.2535	0.1766	0.1544	-0.3137
ENTRC-SC	0.3264	0.4732	0.3925	0.4716	0.3578	0.5885	0.3759	0.0933	-0.1446
GPA-CLIN	0.3014	0.2983	0.3404	0.3090	0.8766	0.2719	0.1102	0.1387	0.1254
NLN-3CNT	0.5437	0.6604	0.4792	0.6020	0.4754	0.6183	0.4182	0.1450	-0.1869
MENT-HLT	0.4207	0.4856	0.4990	0.5795	0.3067	0.6187	0.4964	-0.0886	-0.0378
MED/SURG	1.0000	0.5714	0.5403	0.5516	0.3990	0.5250	0.3170	0.1299	-0.1189
PHARM	0.5714	1.0000	0.5543	0.6297	0.4303	0.6400	0.4445	0.0467	-0.1119
MATERNITY	0.5403	0.5543	1.0000	0.6433	0.4457	0.6789	0.4869	0.0850	0.0016
NURS.CH	0.5516	0.6297	0.6433	1.0000	0.4508	0.7180	0.4999	0.0541	-0.1561
GPA-E-PR	0.3990	0.4303	0.4457	0.4508	1.0000	0.4519	0.2642	0.1234	0.0608
NCLEX-SC	0.5250	0.6400	0.6789	0.7180	0.4519	1.0000	0.7224	0.0558	-0.1354
NCLX-P/F	0.3170	0.4445	0.4869	0.4999	0.2642	0.7224	1.0000	0.0312	-0.1536
RACE	0.1299	0.0467	0.0850	0.0541	0.1234	0.0558	0.0312	1.0000	-0.1422
B-DATE	-0.1189	-0.1119	0.0016	-0.1561	0.0608	-0.1354	-0.1536	-0.1422	1.0000

**VITA**



**VITA**

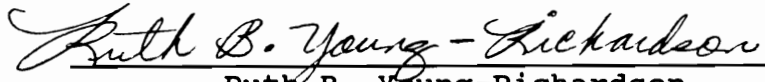
**Ruth B. Young-Richardson, RN**

Home Address: 3306 4th Street, S.E.  
Washington, D.C. 20032  
(202) 562-5431

**Educational Background:**

<b>Degree/Major Date</b>	<b>Institution</b>
AS/Nursing 1973	Washington Technical Institute Washington, D.C.
BA/Sociology 1975	American University Washington, D.C.
BS/Nursing 1976	George Mason University Fairfax, VA
MA/Health Service Administation 1980	Antioch University Baltimore, MD
Edd/Vocational Technical Education 1996	Virginia Polytechnic University and State University Blacksburg, VA

Mrs. Richardson has over 30 years experience in nursing. She began her career as a practical nurse and through the years has continued her education and work to achieve the doctoral level. She is currently employed at the Washington Nursing Facility and serves as minimum data standards nurse (MDS). She is very active in the community, in service organizations, and her church. Mrs. Richardson is the mother of four children.

  
\_\_\_\_\_  
Ruth B. Young-Richardson